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ABSTRACT

This review of nonstandard treatments as they relate to individuals with mental retardation reveals attempts to increase intelligence and make individuals "normal." Covering the early 1930s through the present, the review addresses: cell therapy, electric shock, behavior modification, vitamin B-6 therapy, Doman-Delacato treatment, auditory training, sensory integration, the Feingold diet, Candida Albicans yeasts, facial screening, Dolphin therapy, facilitative communication, and water-misting. The treatments are grouped according to their decade of initial presentation, with major developments briefly highlighted to illustrate their significance in special education. Issues underlying the arguments of advocates and opponents of the treatments are discussed. The role of studies pertaining to each issue is analyzed, and in some cases, the involvement of the U.S. mass media, legislature, and judicial system is mentioned. The following therapies that are professionally accepted and promoted by the education system are also briefly reviewed: art, music, and dance therapy; equine and pet therapy; recreation and play therapy; and physical and occupational therapy. Appendices include a diagnostic checklist for children with behavior disturbances and information on dosages and outcomes of studies of high-dose vitamin B6 and magnesium for individuals with autism. (Contains 151 references.) (SW)

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Historical Overview of Nonstandard Treatments

by

Pamela Hulme

May 1, 1995

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ABSTRACT

Historical Overview of Nonstandard Treatments
Pamela Hulme
May 1, 1995

The review of treatments as they relate to the mentally retarded reveals a spectrum of research attempts focused at increasing intelligence and making individuals "normal".

This review of the literature emphasizes the history of treatments as researched from the early 1930s through the present decade. The treatments include Cell Therapy, Electric Shock, Behavior Modification, Vitamin B-6, Doman-Delacato, Auditory Training, Sensory Integration, Feingold Diet, Candida Albicans yeasts, Facial Screening, Dolphin Therapy, Facilitative Communication, and Water-misting. Each treatment is grouped according to the decade of initial presentation. Major developments as related to the mentally retarded are briefly highlighted at the beginning of each decade's chapter to illustrate their significance in special education.

Also, review of the issues underlying the concerns of both advocates and opponents is discussed. The role of a number of studies pertaining to each treatment is analyzed. In certain instances, the involvement of the American mass media, legislature and judicial system is mentioned in order to determine what role they have in regulating potential treatments for the mentally retarded.

This paper also provides a brief overview of the therapies that are professionally accepted and promoted by the education system. These include Art Therapy, Music Therapy, Dance Therapy, Equine Therapy, Pet Therapy, Recreational Therapy, Play Therapy, Physical Therapy, and Occupational Therapy.

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INTRODUCTION

It has been said that nature alone performs miracles; scientists merely exploit them (Menolascino, Neman & Stark, 1983, p3). If this is true then the statement's application to the field of Special Education is no exception. Parents, educators and advocates are continuously presented with therapies proposed by researchers to increase intelligence or normalize the lives of those classified with a developmental disability. Over the past fifty years, Special Education as a discipline has witnessed the introduction of countless treatments targeted to improve various areas of human functioning. These therapies range in innovation and intrusiveness, depending upon the target of the therapy.

Prior to the late 1970's, early 1980's, very little acceptance was given to stating "cure" in the same sentence with mental retardation. Scientists, researchers, educators and professionals did not want to raise the hopes of those parents rearing a child, regardless of how mild or profound the situation. According to Menolascino & Stark (1988):

> The hope of all parents who have children with developmental disabilities is that their son or daughter will be able to improve so significantly that they no longer retain the label of (a developmental disability or) mental retardation (p3).

The general feeling within the field was to avoid sparking the parents' hope of achieving any level of improvement. Such hopes could only be viewed as too "idealistic" (IBID, p5).

As a very recent step, the Association for Retarded Citizens considered reassessing the extent to which (mental retardation could) be considered irreversible (Menolascino, Neman & Stark, 1983, pxi). In a major national conference entitled the Cure Conference, ARC-US examined ways to combine knowledge current to the times with future research efforts. The results were to commission scientists within differing disciplines to research key areas towards achieving a common goal. Ultimately the search for a cure became the target of all involved.

The word "cure" derived from the the Latin word "cura" means to treat or make better. With 350 known causes for the symptoms of mental retardation, (science and medicine currently speculate) there can be no single cure (IBID, p2). There may however be one or more potential cures. To consider mental retardation, one must regard it "...not as a single entity to be cure like a 'disease'" (IBID, p4). "To cure" in this application would be to significantly increase the current level of intellectual functioning and the concommitant level of social adaptation (IBID, p2). The prevailng definitional concept of mental retardation requires "...the presence of both significantly subaverage measured intelligence and...social adaptation" (IBID). It would therefore be necessary to direct any interest in researching cures toward one or both areas.

It is estimated that every 5 to 10 years knowledge within a new scientific field doubles (Menolascino & Stark, 1988, pxv). Cures within the field of special education can be recognized as addressing treatments on three levels; primary, secondary & tertiary. According to Menolascino, Neman & Stark (1983);

> ...primary prevention removes the causative factors for the

> initial occurrence of the disorder; secondary prevention/ treatment involves attempts to substantially reduce the symptom of mental retardation - to cure; tertiary prevention focuses on long-term developmental, educational and rehabilitational programs (p302).

The three levels have provided research results which have been somewhat promising and simultaneously controversial.

Interestingly, for years research in the area of special education only focused on the tertiary level (IBID). Tertiary prevention has led to outstanding advances in developmentally-oriented treatment and habilitation to maximize the lives of all retarded persons (IBID, p2). Examples of tertiary prevention include parental support and guidance, physical therapy and techniques in enhanced seizure management (IBID, p3). According to Menolascino, Neman & Stark (1983), tertiary prevention attempts to minimalize residual handicaps and to maximize future development (p3). The research emphasis is behavioral (IBID, p5).

Applied research has led our society to realistically speak of the primary prevention of over forty disorders that can produce mental retardation (IBID, p2). Primary advances include rubella vaccine, intrauterine fetal surgery and others. The main goal of primary is the total prevention of the handicapping condition (IBID, p3). Research emphasis is placed on biomedical aspects of severe/profound and moderate retardation (IBID, p5).

Secondary prevention involves very early diagnosis; the purpose involving the reversal of the handicapping condition to a normal state (IBID). Preventions at this level have addressed the following conditions: lead intoxication, congenital hypothyroidism and early, comprehensive treatment of meningitis and encephalitis (IBID). Secondary's research emphasis combines primary's biomedical focus with tertiary's behavioral emphasis. Specific organizations such as ARC-Us have attempted to focus their research at this level. At ARC's 1977 Cure Conference, a major policy statement was adopted asserting their commitment to researching for cures.

A researcher's first step toward developing a cure is to target an area or speciality. Specializations within the field have risen out of various methodologies; a number of which have provided some attempt at addressing treatments and cures. Biological, physical, sociological, psychological and environmental theories are just a few of the numerous aspects that have been or are currently being developed. Ultimately achieving a cure will be the common thread to pull the differing avenues together.

The diversity of the contributing disciplines however has resulted in an overload of information. Parents, educators and advocates are forced to read through volumes of research in order to make sense out of an already complicated issue. A therapy can appear one day and by outdated by newer information the next. In an age where technology and science change so rapidly, this process of researching treatments and cures is never truly completed. Those willing to consider choosing a treatment are faced with a few challenges: submit to trying a treatment which at the time may remain unsupported, wait for the resulting material to be published, or research the availability of a more sound method. This can be an excruciating process for those who build their hopes around helping a group of individuals once considered to be incurable.

Historically, the mentally retarded have only recently begun to receive cumulative scientific as well as public support. Treatments and therapies aimed at achieving a cure however have been emerging since the beginning of the twentieth century. Thus many treatments were created prior to the movement to deinstitutionalize the mentally retarded and treat them as human. Within the literature nonstandard treatments exist which date back prior to the recognition that a mentally retarded individual had rights, feelings and legal protections. Nonstandard treatments continue to be introduced and considered part of an individual's treatment plan, even at a time when society attempts to be more socially enlightened.

Existing therapies are categorized according to their level or combination of intrusive, aversive and degrading techniques. It is important to take note that the chronological emergence of the therapies does not necessarily reflect the most intrusive and inhumane therapies as having been the ones developed almost seventy years ago. Although in some instances this may have been the case, there are current therapies which raise the question and concern of fellow professionals. Examples of questionable therapies include facial screening, water misting and electric shock. The documentation exists to show the practice of such therapies may still be supported today.

This paper will focus on a selected number of nonstandard treatments. It would be impossible to analyze all available treatments due to the length of this project. However, those treatments chosen have appeared to have gained significant public notice over the years. Review of the literature will begin chronologically. Treatements will be individually analyzed according to the intended areas of functioning they target. Specific arguments from both advocates and opponents will be addressed. In certain instances mass media involvement will be reviewed for those cases in which media contribution aroused public consciousness or may continue to do so.

It will also be important to briefly consider those treatments which are promoted and professionally accepted from within the special education community. Classrooms and clinics around the country currently practice these therapies. Examples of accepted therapies include Art, Music, Physical and Occupational. Supportive research and the backing of many organizations have paved the way for these therapies to receive the recognition their research has earned.

A majority of the treatments however have not received support form the special education community. Associations such as the American Association on Mental Retardation (AAMR) and it's predecessor, the American Association on Mental Deficiency (AAMD) have published oppositional statements for those treatments they find to be aversive. According to Turnbull, Guess, Backus, Barber, Fiedler, Helmstetter and Summers in Dokecki and Zaner (1986):

> ...the term aversive procedure or intervention is any intervention that is applied as a result of a person's behaving in certain disapproved ways, and that is intended to have or has the effect of producing physical or emotional pain or discomfort (p168).

Taking this definition further, aversive can encompass those interventions found not to be "positive": seclusion, timeout, physical restraint, or "...any procedure objected to by the recipient...."(IBID).

Ethically this raises a multitude of moral questions. Quality of life, the worth of a life, "...the consciousness of what (society is) doing, research into how to do it and suitable generalization of the principles of (our) choice..." all leave the special education community with large dilemmas to contemplate (Lachs in Dokecki and Zaner, 1986, p95). Such questions add fuel to the fiery debate over promoting treatments found to be questionable, aversive, and not wholeheartedly supported by major associations.

In an effort to address such issues, the notion of creating advocacy committees to ensure client rights gained considerable popularity during the 1970's - 1980's. According to Griffith and Henning (1981):

> These are instances of committees or boards, being given the responsibility for monitoring the implementation of court orders or consent decrees fashioned to improve treatment conditions in institutions, ...review of intrusive procedures is often mandatory, ...and certainly recommended. (p61).

While there is no federal mandate requiring the establishment of such committees, their role can be found to be loosely defined in regulations governing the Medicaid program for Intermediate Care Facilities for the Mentally Retarded (IBID). Called Human Rights Committees (HRCs), their general role becomes one of advising administrators on rights issues (IBID). The professional standards of the Accreditation Council for Services for

Mentally Retarded and other Developmentally Disabled Persons (ACMRDD) suggests specific responsibilities for an HRC, with numerous states supporting such a measure (IBID).

Disagreement in the area of treatments can also lie within the definitions being used. For instance, according to the American Association on Mental Retardation, disagreement over terms such as "aversive therapy', punishment, punishers, least restrictive alternative and intrusive require consideration (1988, p315). Special Education as a whole contains many terms which cause parents, professionals and advocates much confusion. Teachers and others are often left to use their "professional judgement" when confronted with the need to use behavior modification or any other "adversive" technique (Spreat & Lanzi, 1989, p375). Human Rights Committees attempt to fill the void and reduce the professional confusion surrounding the topic.

Recently, a number of special interest and advocacy groups have emerged with the intent to help shed light on the treatment and terms. They include but are not limited to: American Association on Mental Retardation, 1986, revised 1990; Association of Retarded Citizens/U.S., 1985; Association for Persons with Severe Handicaps, 1986; the American Psychological Association Division on Mental Retardation, 1989; the Association for the Advancement of Behavior Therapy, 1982 and the National Institute of Health, 1989. Many have released statements supporting or refuting a number of available treatments and terms. Such statements add to an already cumbersome topic at hand.

The paper which follows will attempt to provide a resource for parents and professionals through addressing available nonstandard treatments. The treatments will be presented according to the year in which the primary research was published. In some instances only secondary information was available. Whenever this occurred the original dates of the treatment's descriptions will be used. It should also be noted that the length of this project made it impossible to represent all treatments. Interestingly a number of the treatments apply specifically to the autistic community. However, those discussed were not chosen with this criterion in mind. The selection of treatments were chosen to provide a greater awareness to those interested in considering their use.

Historical Overview of Nonstandard Treatments

The 1930's - 1960's

The chronology of society's perception of the mentally retarded plays a critical role in treatment research. During most of the early twentieth century historical references on the mentally retarded and society confirm that society rarely regarded the mentally retarded due to "...an 'out of sight, out of mind' philosophy" (Begab in Begab & Richardson, 1975, p5). Generally, society considered the mentally retarded to be "...dysfunctional elements to community stability and disruptive to family life..."(IBID). Institutionalization was widely believed to be the means in which to deal with such individuals. Very rarely was any mention made to habilitation or cure.

Historically, monumental American and International events such as World War I and the Great Depression diverted attention from the mentally retarded to "...more pressing issues" (IBID, p7). It was Henry Goddard in 1928 who attempted to change such societal perceptions by charging "...it was time to change several of our time honored concepts-first of all, feeblemindedness (an early term to describe the condition now termed mentally retarded) is not incurable..." (Goddard in Scheerenberger, 1983, p179). Goddard viewed the mentally retarded as a population who could potentially receive therapeutic help. His claim was substantial, although he did not offer any clues or research to substantiate his statement.

During the 1930's, Down's syndrome or Mongolism began to receive widespread attention. Linked with the themes of World Wars I and II, the questions of heredity, racebetterment and immigration were of both national and international concern (IBID, p184). Genealogical studies and intellectual test development focused some researchers on analyzing chromosomes and gene pools to locate cause or correlation. Mental Retardation as it was later termed began to be approached from the perspective that individuals could be treated, if not cured.

Cell Therapy

One nonstandard treatment to come out of this time period was referred to as Cell Therapy. Paul Niehans, a Swiss surgeon developed what he termed "Cell Therapy" and promoted it as a cure for "...a wide range of human conditions, including old age" (Fackelmann, 1990, p168). Using cells from fetal rabbits and sheep, Niehans promoted the idea that chemicals (which he could not identify) were emitted from the cells of these animals. He believed the "...unknown chemicals stimulate growth in aging human cells' (IBID). Evidence of his published work ended here.

In the 1960s Franz Schmid, a West German physician picked up Niehans' research and carried it a step further with regard to Down syndrome children. Intramuscular injections "...of a preparation containing freeze-dried fetal sheep or rabbit cells..." was given to children during several sessions (IBID). Schmid claimed his therapy led to "dramatic results" in patient improvement when combined with other treatments (physical and speech) (IBID). According to Fackelmann, Schmid wrote several books on the results of his research and "...now retired (1990), Schmid continues to advocate his regimen...claiming it boosts intelligence and improves poor motor and social skills (IBID).

In 1964 British researchers published a study on their findings of similar research called the LANCET report. In this study, five children with Down syndrome were given shots of animal fetal cells. As compared with a control group after a one year period, the researchers found both groups scored equally well on tests that measure intellectual and motor ability (IBID). Other reports followed from European and Canadian researchers, none of which could conclude better results than this.

From 1984 to 1986, Don C. Van Dyke and David J. Lang combined their efforts to create a U.S. research team. Their research focused on 190 Down syndrome patients between the ages of 2 months to 19 years. Psychologists and occupational therapists gave the 190 study participants a battery of tests to measure intelligence, motor abilities and social skills. Parent interviews were conducted, finding that 21 children (or 11%) out of the original 190 stated their children had received Cell Therapy at some point in their lives (IBID). Those children were then compared to a control group of similar age, sex and socioeconomic background.

According to the results, Van Dyke and Lang could show "...no statistically significant differences for any of the 18 social, developmental or growth variables measured" (IBID). Van Dyke and Lang's findings were published in Pediatrics magazine in January, 1990. According to Fackelmann, critics of their research such as Janice S. Statham, who chairs the New Hope Parents Association, a Huntsville, Alabama-based group, support Cell Therapy for use with those with Down syndrome. Statham felt

"(Van Dyke and Lang) had lumped children who had gotten just one shot (of Cell Therapy) in with children who had received multiple fetal cell injections"(IBID). She supported her statements based upon parent accounts from within the New Hope group that "...children must get repeated treatments to show progress"(IBID).

According to Fackelmann, Van Dyke and Lang acknowledged their retrospective study had disadvantages (IBID). According to Van Dyke (in Fackelmann, 1990), "...the findings came from a larger study of Down syndrome that wasn't designed to home in on Cell Therapy's efficacy' (IBID). He further admitted some test evaluators could have known about their subjects' Cell Therapy status (IBID). Lang stated (in Fackelmnn, 1990) "...the data from (their) study, taken together with past reports, indicate Cell Therapy doesn't work...." (IBID).

A majority of U.S. scientists do not support Cell Therapy due to evidence of poor or nonsupportive research findings. According to Felix F. De La Cruz of the National Institute of Child Health and Human Development in Bethesda, Maryland (in Fackelmann, 1990), "no evidence exists that Cell Therapy is an effective treatment for Down syndrome at this time (p168). According to Fackelmann (1990), Allen C. Crocker of the Harvard Medical School in Boston further adds "...I think it holds no useful promise" (IBID). Although there is a reluctance to promote Cell Therapy in the U.S., evidence does exist of supportive parent groups and researchers who consider it to be a treatment option.

A pro-1986 survey of 116 Cell Therapy patients was conducted by psychologist Alfred Baumeister of Vanderbilt University in Nashville, Tennessee. According to

Baumeister's study (in Fackelmann, 1990), of the 116 patients, 71% of their parents believed the (Cell Therapy) shots improved their child's learning ability and 85% would recommend Cell Therapy to other parents (IBID). This study failed however to provide any supportive or oppositional research to the substantiation of the claims made by Van Dyke and Lang or other International researchers. Baumeister only used parent observation as his research tool.

Medical professionals are alarmed by the prospect that even with the existence of inconclusive studies, parents and researchers continue to support Cell Therapy. Such concern provides a foundation on which to present an oppositional platform. According to Crocker (in Fackelmann, 1990):

> All Down (syndrome) experts agree children may suffer allergic reactions to injections of cells taken from animal tissue...injections of fetal sheep cell may transmit agents such as microorganism causing scrapie, a degenerative central nervous system disease that afflicts sheep (IBID, p170).

Lang provided a retort to this statement (in Fackelmann, 1990) by promoting Crocker's statement as being "...overblown...we don't have any evidence at all that the slow viruses of sheep are transmissible to man" (IBID).

Even after having read the study results, those opposed to the therapy can understand the human motives behind a parent's intent to try Cell Therapy. The medical profession offers very few treatment alternatives to the parents of Down syndrome children. According to Fackelmann (1990), Lang stated, "these parents are very much at a loss as to know what to do for their children. The medical profession offers them precious little" (IBID). Further, the therapy as a whole lacked being put to any airtight tests. Parents and professionals should approach Cell Therapy with these points in mind.

Electric Shock Therapy

Electric shock as a treatment technique for the mentally retarded was initially mentioned at the introduction of electricity during the early part of the nineteenth century. The French physician Leopold Turck proclaimed in 1847 (in Scheerenberger, 1983), "insanity is invariably to be scribed to an abnormal accumulation of electricity in the electro-negative organs, and especially in the skin" (p63). In 1849 Dubois Reymond applied use of the induction coil to stimulate muscles to be used with the epileptic and paralytic. William Wetherspoon Ireland, noted for publishing the first genuinely comprehensive text on mental retardation suggested around the same time period (in Scheerenberger, 1983), "electricity ought to be tried, though I cannot say I have ever been able to trace any very decided benefit from its use" (IBID).

Since these statements were made, the use of electric shock therapy has been tested over the years as an effective reducer of behaviors. Many behaviors which are treated with electric shock are termed "negative practice" behaviors. Negative practice was initially described in the literature by Dunlap in 1932 (Wooden, 1974, p81). Negative practice is a technique which involves repeating a behavior one wishes to eliminate (Kazdin, 1978, p165). In 1958 Yates was one of the first to treat a series of tics by use of negative practice (IBID). Yates attempted to provide a rationale for use of this technique within his early writings.

During the 1960's the use of electric shock as a treatment of mental retardation was demonstrated. Lovaas, Frietag, Gold and Kassorla (1965) attempted to prove that response-contingent shock would suppress self-injurious behaviors such as head-banging (Prochaska, et al., 1974, p285). Similarly, others (Lovaas and Simmons, 1969; Risely, 1968; Corte, Wolf and Locke, 1971; and Miron, 1971) found that response-contingent shock quickly reduced the rate of such behaviors (in IBID). However, their research also showed that poorly generalized treatment settings were frequently reported (IBID).

In a majority of the cases in which electric or faradic (direct current) shocks were used, the researchers devised special apparatuses capable of delivering a predetermined charge. A hat or bonnet was the typical method used to deliver about 70 to 100 volts, equivalent to a lower amperage through electrodes applied to the patient's forearm, wrist or calf (Ludwig, et al., 1969, p625). The procedure would involve shocking the patient immediately, oftentimes after a visual presentation or the occurrence of a specific behavior. Conditions often treated with shock included (but were not limited to) cases of those involved in "...compulsive gambling, homosexuality, compulsive eating, fetishism, transvestism, car stealing, obsessional ruminations (vomiting), smoking, writer's cramp, alcoholism, habitual blushing, compulsive copulation with sheep and marital infidelity (IBID). According to Ludwig et al. (1969), "it is important to emphasize that in...these cases the 'voluntary' consent and active cooperation of the patients were required as a precondition for treatment" (p625).

One area that has generated a great deal of electric shock research has been conducted with autistic and severely retarded children. Lovaas and his coworkers were pioneers in this field. They would employ such measures as use of the electrified grill and cattle prod ("the shock stick") as a means of controlling and modifying self-mutilative, aggressive, and other forms of maladaptive behavior in these children (IBID). According to Ludwig et al. (1969),"... in these cases, the consent and active cooperation of the children and parents were not always sought" (p625).

There are numerous studies on record in which researchers attempted to control self-injurious behaviors by means of employing electric shock. Yeakel, et al (1970), used a bonnet that delivered an electric shock to the arm of a 14-year-old patient who was a chronic headbanger (p159). The theory behind the study was that headbanging could cause irreversible damage to the patient's head, such as blindness (IBID, p159). The other interest in decreasing the behavior was to reduce and ultimately help control the individual's level of frustration.

In the Yeakel et al. study (1970), the underside and outerportons of the bonnet were made of heavy canvas; the outer having pockets which could store inflatable balloons used to absorb a blow if struck (p161). Straps were used to secure the bonnet around the head. The use of autoinduction as a method of shock delivery created an appliance design unlike earlier models (IBID, p161). Theoretically, a blow delivered to any part of the bladder of the newly designed bonnet would cause sufficient change in the air pressure to activate a microswitch embedded in the air bladder (IBID, p161-162).

When struck, the shock was intended to be delivered to the arm.

Interestingly, this bonnet had a number of difficulties and never performed the way it was intended. For instance, the bladder was found to occasionally experience slow leaks which would interfer with it's ability to inflate to it's maximum air pressure. The lessening of the air in the bladder tended to create voids rather than be full enough to apply pressure to activate a microswitch (IBID). An attempt was later made to alter this appliance's design to use water-filled tubes in place of the air tubes. Here too, leaks developed and the correct charge was not emitted.

An interesting finding of the Yeakel et al. study was made during observations of a patient while she was wearing an autoinduced bonnet. It was noted that the patient made a very rapid association of her headbanging with the adverse stimulus received to her arm (IBID, p168). The headbanging in this study was noted to decrease regardless of the fact that situations were created which in previous studies have been found to inflate behavior occurrences (IBID). However, Yeakel et al. noted that removal of the electrodes from the arm prior to removal of the bonnet lead the patient to "...hit her head quite vigorously" (IBID). Beyond this, no other sound scientific conclusions were drawn.

Researchers have also employed the use of electric shock therapy to attempt to suppress rumination (vomiting) behavior. Chronic or habitual vomiting has been described as persistent regurgitation of previously swallowed food in the absence of organic factors (Toister, et al., 1975, p55). Psychological or behavioral implicatons are often emphasized due to the fact that organic factors are generally unattributed (IBID).. According to Toister et al. (1975), the severity of this act can lead to emaciation and starvation, cases of which have been reported (IBID). In 1969, Lang and Melamed reported that contingent mild electric shock resulted in rapid reduction and permanent suppression of vomiting and rumination without side effects or symptom replacement (in IBID).

Lichstein and Schreibman (1976) reviewed the side effects of employing electric shock with autistic children. They felt there were two main issues to be addressed; the first being the use of electric shock per se and the second being the shock as an adversive stimulus in the punishment paradigm (Lichstein and Schreibman, 1976, p164). According to Lichstein and Schreibman, punishment refers to the operant conditioning procedure whereby an aversive stimulus is presented contingent upon the occurrence of a specified behavior (IBID). The purpose of addressing such a behavior would be to decrease the recurrence of this specified behavior (IBID). A formidable body of research exists which supports and refutes the use of punishment. Both sides to the issue will be discussed in future chapters of this paper.

Lichstein and Schreibman intended to review the use of electric shock with autistic children in an attempt to evaluate the nature of potential side effects. After careful review of 12 studies, they found that electric shock proved to be a highly effective therapeutic agent with autistic children (IBID, p165). In all the cases, the targeted undesireable behaviors were reduced or eliminated using the shock procedure (IBID). They cautioned, however, that this treatment should not in any way be considered as a panacea (IBID).

The positive side effects noted in the Lichstein and Schreibman article will be addressed first. One of the more important side effects is known as response generalization (IBID). The children learned after a very short period of time to pair the undesireable shock with a certain action or behavior (IBID). This generalization would lead to a rapid reduction of the behavior, but only after an initial increase were experienced (IBID). In most cases, an initial increase following the initial implementation of a procedure occurred, which in some cases could be attributed to the patient testing the researcher's response (IBID).

Another positive side effect noted was an overwhelming increase in social behavior. According to the Diagnostic and Statistical Manual, IV edition (1994) or DSM-IV, a major symptom of autism is a lack or impaired level of social behavior. Examples include stand-offish in manner, sustained odd play behavior, lack of eye contact with others, no attempts being made to interact with other peers or adults and appearance as though deaf or unaware of the presence of others (Fourth edition, revised, 1994). In the Lovaas et al. (1965) shock-avoidance study (in Lichstein and Schreibman, 1976), it was found that in addition to learning to approach the experimenter, the children became more affectionate and sought out adult company (pp166-167).

Lichstein and Schreibman revealed other studies that experienced similar results after initiating electric shock therapy including: Simmons and Lovaas, 1969, patient noted to develop extreme affectionate response, permitting eye contact and displaying smiling and hugging in experimenter's presence; Risely, 1968, reported increased eye contact; Birnbrauer, 1968, found a general increase in sociability and cooperation; and Bucher and Lovaas, 1968, who noted initiation of "very good" eye contact and 100%

performance on tasks where improvement had been previously been lacking (IBID, p167). This increase in positive emotional behavior is viewed by some parents and researchers as enough reasoning to continue practice of shock therapy. Here too, as previouly mentioned in the case of Down syndrome, medicine offers little alternative for curing the autistic.

Lichstein and Schreibman also considered the negative side of electric shock therapy. Fear of the shock apparatus appeared to have been one of the more commonly reported reactions. Baroff and Tate (1968) noted a "phobic response" to the buzzing sound of the shock device (in IBID, p168). Similar responses were noted by Merbaum, 1973; and Bucher and King, 1971 (in IBID). Bucher and Lovaas, 1968, reported the patient responded to the apparatus by covering his ears and leaving the chair and crying and shivering; Bucher and King, 1971, noted change in behavior to "quiet and sullen"; and Lovaas, 1965, reported "decrease in overall happiness and contentment" (in IBID).

Lastly, an increase in other undesirable behaviors was noted. Some researchers reported "...when response contingent shock was used to eliminate one undesirable behavior, another undesirable behavior increased in frequency" (IBID). According to Lichstein and Schreibman (1976), this occurrence could be linked to "symptom substitution" or the attempt on the child's part to reinstate the reinforcer previously available for the shocked behavior to another behavior (IBID). This experience is also known as behavior transferrence (IBID). Evidence of this was noted in Bucher and Lovaas' 1968 study which reported that when one child was shocked for self-abuse, her aggression toward other children increased at a later time (in IBID). Throughout the literature the expression of alternate behaviors were documented in different forms.

Lichstein and Schreibman concluded their 1976 report by stating "...the reported side effects of shock with autistic children did not appear sufficient to rule out the use of this method of treatment" (IBID, p170). Many individuals as well as organizations were outraged by such a position. The Journal of Autism and Childhood Schizophrenia , the publishing journal of the Lichstein and Schreibmann article received numerous letters to the editor opposing the use of electric shock therapy. Reactions included concern over ethical issues: abridgement of individual rights; "...(electric shock therapy) produces flesh and blood robots..."; "...is intrusive..."; and painful (Akerley in Lichstein and Schreibman, 1976, p289).

A number of professionals and organizations have called for the complete abolition of the use of certain punishment programs, particularly the use of electric shock programs (Spreat et al., 1989, p246). Spreat et al. specifically noted the existence of opposition in their article, "The acceptability of electric shock programs", published in the April 1989 Behavior Modification (IBID). McGee and Hobbs (1986) and the organization TASH (the Association for Persons with Severe Handicaps) (1987) were two examples of those publicizing opposition of the use of electric shock therapy (IBID). Spreat et al. conducted their own study using electric shock on deaf and mentally retarded adult males. Their findings suggested "...this procedure be reserved for serious behaviors that have been unresponsive to other forms of treatment" (1989, p253). There findings substantiate what Carr and Lovaas had reported in 1983 (in Spreat et al., 1989):

> ...RCES (Response Contingent Electric Shock) be considered

> a final alternative, to be used only after non-aversive and mildly aversive procedures have been demonstrated to be unsuccessful (p253).

Interestingly, in the Spreat et al. 1989 study few examples of the debate over the use of electric shock were represented. Their data, combined with other study results led Spreat et al. to conclude their study with the following statement:

> ...although the obtained indices of predictability (in the study) were not overwhelmingly large, the fact that some degree of predictability was possible is a significant issue. If all subjects were accepting of oppositional statements against the use of aversive behavior modification procedures, there could be no predictability, as the use of shock would be unacceptable in all situations (1989, p254).

Behavior Modification

Behavior modification or behavior therapy refers to a methodological approach for developing, implementing, and evaluating behavior-change techniques derived from psychological research (Kazdin, 1978, p2). The purpose of this therapy is to "...eliminate debilitating (or abnormal) behavior and enhance human functioning, ...to modify behavior" (IBID). Traditionally, abnormal behavior has been considered within the domain of medicine, as exemplified with such terms as "mental illness" and "psychiatric hospital" (IBID, p3). The introduction of behavior modification in the early 1960s as a branch of psychology (or a more scientific study of behavior) represented a departure from the traditional medical model of thought (IBID).

Behavior modification grew out of several combinations of theorists. The introduction of behaviorism into psychology in the early 1900s was of central importance to contemporary behavior modification (IBID, p4). John B. Watson, who proposed the basic theories of behaviorism emphasized rigorous methodological requirements for scientific research in psychology (IBID). Watson rejected the subjective areas of inquiry and methods of study that characterized the psychology of his day (IBID). He insisted upon objectivity and concentration on overt events in studying behavior rather than the prevalent subjectivism associated with private experience (thoughts, images) (IBID).

Also important to behaviorism was research in the psychology of learning which was occurring parallel to Watson's. Much of this work derived from physiology experiments in Russia and animal learning in the United States (IBID). Russian Ivan P. Pavlov is one of the more famous behaviorists, deriving this status from his conditioning focus upon the salivary reflex of dogs (IBID, p55). Terms associated with his study included: conditioned reflex, which was established by repeatedly pairing a stimulus that elicited a reflex reaction (an unconditioned stimulus) with a neutral stimulus that did not (a conditioned stimulus)...pairing the conditioned stimulus with the unconditioned stimulus was called reinforcement...repeated reinforcement was required to establish a conditioned reflex (IBID pp55-56). Food (the unconditioned stimulus) was paired with a tone (the conditioned stimulus), the salivary reflex (the unconditioned response would be elicited only in the presence of food, yet by repeatedly pairing food with the tone the tone alone would elicit salivation (a conditioned response) (IBID, p56).

Reviewing the literature, one would find there were numerous other individuals who contributed to the early development of behavior modification. Size limitations of this paper set restrictions on mentioning them all. However, behavior modification could not be discussed without reviewing the role of B. F. Skinner's research, conducted during the 1950s. Skinner's research principles and terminology have had such an impact on the field of special education that today they can still be found in pure behavior modification educational programs.

The term used to refer to Skinner's collective work is operant conditioning. The principles of operant conditioning describe the relationship between behavior and the environmental events that influence it (in IBID, p97). The basic principles of operant conditioning include reinforcement, punishment, extinction, and stimulus control (IBID). The principle of reinforcement refers to an increase in the frequency of a response that is immediately followed by certain consequences or a reinforcer (in IBID). Positive reinforcement and negative reinforcement are the two variations in the reinforcement principle (IBID, p98). Food and social praise are the primary and secondary positive reinforcers found to increase motivation when working with children.

Punishment refers to the presentation or withdrawal of an event contingent upon a response that decreases the probability of the response (in IBID). Two variations also exist in the punishment paradigm: the presentation of an aversive event or the removal of a positive event (IBID). The removal of a positive event that results in a decreased response is also referred to as a time-out from reinforcement if the positive event is withdrawn for a specific period of time (IBID). Punishment and time-out will be discussed in future paragraphs of this section.

According to the principles of operant conditioning, extinction is referred to as the discontinuation of delivery of a reinforcer after a given response (IBID). With extinction, no consequence actually follows a response, i.e., an event is not delivered or taken away (IBID). Instead, an event that was administered previously for the response is no longer provided (IBID). For example, when using an extinction procedure to treat tantrums, a therapist would ignore the behavior and proceed as though the tantrum was not occurring (in Harris and Ersner-Hershfield, 1978, pp1355-1356). Extinction differs greatly from punishment due to the fact that with punishment the removal of an item is more obvious than the "planned ignoring" employed with extinction.

Stimulus control is another important principle in operant conditioning. According to Skinner (in Kazdin, 1978), operant behavior is influenced by antecedent events as well as consequences (p99). The control of antecedent stimuli results from associating different consequences for a particular response across different stimuli (in IBID). A response may be followed with a reinforcing or punishing consequence in the presence of another, referred to as SD or stimulus direction (in IBID). When an organism responds differentially to different stimuli, it has made a discrimination and the behavior is considered to be under stimulus control (in IBID). Thus, the stimulus conditions exert control over behavior because of the different contingencies with which each stimulus is associated (in IBID).

In the early 1950s, Sidney W. Bijou tried operant conditioning on children. In his preliminary research he evaluated different types of reinforcers and responses (in IBID, p180). His early tasks required children to drop a ball through a hole, and was later replaced with a lever-pressing device (IBID). Bijou's research, which continued into the later 1950s included the study of retarded and normal children and the effects of various reinforcement schedules on behavior (IBID). Bijou had taken the position that mental retardation should be dealt with from a behavioral perspective (in Patton et al., 1990, p 58). According to Patton et al., Bijou suggested (1990):

> ...developmental retardation be treated as observable, objectively defined stimulus-response relationships without recourse to hypothetical mental concepts such as 'defective intelligence' and hypothetical biological abnormalities such as 'clinically inferred brain injury'. From this point of view a retarded individual is one who has a limited repertory of behavior shaped by events that constitute his history (p58).

By the 1960s, behavior modification had stretched across international boundaries. Professional development within the field of behavior therapy expanded the scope of behavior modification. Two major professional organizations for behavior therapy were formed in the United States: the Association for Advancement of Behavior Therapy (AABT) and the Behavior Therapy and Research Society (BTRS) (in Kazdin, 1978, p197). Conferences were held to spread application ideas. Publications in behavior modification demonstrated the expansion of the field into the late 1960s and early 1970s. The major professional publications included Behavior Research and Therapy, Journal of Applied Behavior Analysis (JABA), the Journal of the Experimental Analysis of Behavior (JEAB), Behavior Therapy and Behavior Modification .

In the 1960s programmed instruction flourished as a new area of research and application (IBID, p243). Review of behavior modification literature demonstrates the diverse range and focuses of contributing researchers. In the area of educating the autistic, one individual and his colleagues made prominent strides. Ivar Lovaas applied behavior modification principles, as developed by Skinner and Bijou to create an educational methodology. The focus was to educate as well as to accommodate the behavioral symptoms associated with autistic individuals. Using the principles of operant conditioning (reinforcement, punishment, extinction and stimulus control), Lovaas and colleagues developed an instructional teaching method called discrete trial teaching. Evidence of current support of discrete trial teaching can be found with the establishment of national and international educational programs which practice Lovaas' methods.

Opposition of behavior modification has fallen within the punishment principle of operant conditioning. Punishment can produce a heated debate amongst individuals and is one that raises numerous ethical questions. According to Harris and Ersner-Hershfield (1978), "few people...are without an opinion on whether punishment ought to be used to change behavior" (p1352). In order to address the controversy, the term aversive must be defined. Aversion therapy (based upon operant conditioning) is a series of techniques in which aversive events are used to alter behavior (in Kazdin, 1978, p218).

Gerhardt et al. (1991) defined aversion therapy more clearly as "any stimulus or stimulus event which, when presented contingent on the display of a behavior, reduces the probability of the behavior being displayed again" (p266). Kazdin provided the example of performance of a maladaptive behavior which is followed by electric shock (IBID).

Contemporary aversion therapy takes several forms. Electric shock as a therapy alternative has already been discussed in this project. To one person, any or all of the therapies discussed in this project can fit the above definitions of aversive. Harris and Ersner-Hershfield listed additional forms of therapy likely to be considered aversive, including restraint, use of liquids that taste or smell unpleasant, and overcorrection (1978, p1367). These forms of punishment fall under the umbrella of behavior modification. They will each be discussed prior to the ethics of punishment as a whole.

According to Harris and Ersner-Hershfield (1978), restraint is one punishment technique that has long been abused (IBID). Restraint used to mean simply tying a person to a bed or placing someone in a straitjacket for a prolonged period (IBID). According to Favell et al. (1981), physical restraint with devices such as rigid arm splints, helmets, camisoles, beds or chairs are examples of a few of the most prevalent methods of controlling self-injury and other serious behavior problems (p425). Restraint becomes an aversive therapy if and when the patient links a behavior to the resulting restraint (IBID). In many cases, individuals with challenging behaviors are restrained as opposed to the therapist attempting to address the behavior through implementation of a less restrictive means.

Another form of aversive punishment is the use of liquids that taste or smell unpleasantly. In a 1974 study Conway and Bucher used a shot of shaving cream in the mouth to control tantrums in a profoundly impaired girl (in Harris and Ersner-Hershfield, 1978, p1367). In a 1974 study, Sajwaj, Libet and Agras used a 5- to 10-cc squirt of lemon juice in the mouth to treat life-threatening vomiting in a 6 month-old infant (in IBID). In 1975 Tanner and Zeiler reported crushing a capsule of aromatic ammonia near the nose of a 20-year-old autistic woman to suppress self-injurious behavior (in IBID). Other aversive therapies include washing the mouth with mouthwash and Tabasco sauce (in IBID). The dangers with using such aversive therapy lie in the fact that even mild substances can produce unpleasant or lethal side effects in sufficient quantities (IBID).

In 1972 Foxx and Azrin introduced overcorrection as a way to minimalize the negative aspects of traditional forms of punishment (in IBID, p1361). Overcorrection is viewed as an educative process composed of two main components, restitution and positive practice (IBID). Restitution requires the disrupter to repair the surroundings so that they are better than prior to the disturbance (IBID). Positive practice requires repeated practice of relevant behavior (IBID). For example, a commonly-used toileting overcorrection may involve the offender wiping the soiled area and washing and changing him/herself. In this instance there may or may not be any aversive elements involved.

Studies however have shown that aversive overcorrections do exist. Doke and Epstein (1975) reviewed Foxx and Azrin's 1973 article, "Overcorrective Oral Hygiene" for a thumbsucking behavior (p498). Their technique consisted of brushing the child's teeth with an oral antiseptic, contingent upon each episode of hand-mouthing (in IBID).

Interestingly, Foxx and Azrin found that contingent verbal warnings or threats could be used to maintain reduced levels of object-mouthing without having to brush the child's teeth with the oral antiseptic (in IBID, p502). It should further be noted that use of an overcorrection method does not necessarily mean it has to be aversive in nature. In 1974 Epstein et al. stated (in Doke and Epstein, 1975) "... overcorrection procedures designed for a specific behavior problem can be used effectively to manage different problems without the use of aversive techniques" (p498).

Opponents view neglect and abuse as potential side effects of punishment and aversive therapy (Gerhardt et al., 1991, pp269-270). A number of other ethical issues exist with the use of aversive interventions. Some question whether it is correct to impose pain or discomfort on an individual who is intellectually unable to give free and informed consent (IBID, p270-271). Gerhardt et al. posed three additional questions concerning the use of aversive interventions (1991):

> (a) What is the intent in imposing pain or discomfort?
>
> (b) What are the relative risks and benefits of this imposed pain or discomfort?
>
> (c) What safeguards exist in lieu of individual free and informed consent? (p271).

The issue of the quality of the life of the patient absorbs this debate. Opponents question the level of patient involvement to accept or deny a therapist's recommendation to use an aversive therapy or punishment. Opponents add further debate by questioning the extent of which the patient understands the consequences of prescribed therapy (IBID).

The issue of informed consent must also be considered in respect to aversive techniques and punishment. According to Gerhardt et al. (1991):

> in the case of the use of aversive interventions,"...the full, informed consent of an individual with a developmental disability may be difficult, if not impossible to obtain ...in order to provide informed consent, an individual must be able to meet the requirements of competence, knowledge, and volition (p271).

Competence refers to an individual's ability to make a rational, balanced decision (IBID). Knowledge reflects an individual's understanding of the proposed treatment, alternative treatments, and the risks and benefits associated with both (IBID). Volition requires that an individual's decision-making be free from coercion (IBID). In general all three must be intact when determining the use and effectiveness of a potential therapy.

It is important to analyze the legal implications which have been raised over the years by the application of punishment and aversive interventions. In 1972 , Wyatt v. Stickney secured legal rights regarding the use of aversive interventions (IBID). The U.S. District Court of Alabama held:

> ...patients at a state institution for individuals with mental retardation have the right to individual treatment as will give each of them a realistic opportunity to be cured or to improve his or her mental condition (in IBID).

The court further ordered the development of a standing Human Rights Committee

(HRC) to oversee a number of human rights issues, including the use of behavioral interventions employing noxious or aversive stimuli (in IBID, p272). HRCs were initially discussed in the introduction of this paper. In setting up HRCs, the courts acknowledged the potential treatment value of such interventions, while recognizing the need for some degree of regulation over their implementation (IBID).

In Youngberg v. Romeo, the United States Supreme Court upheld the right of institutionalized individuals with mental retardation to receive reasonable training under safe conditions, and to be protected from "unreasonable restraints" (IBID). The Supreme Court unanimously agreed the complainant (Romeo) was entitled to enough training to provide him with some control of his aggressive behavior (in IBID, p273). This case did not directly address adversive treatments. However, Youngberg v. Romeo did establish the constitutional right of institutionalized individuals to receive at least "minimal" treatment for control of problematic behavior, and reinforced the obligation of the caregiver to provide such treatment (IBID).

Possibly the most widely publicized case to deal directly with the use of aversive interventions came in 1987 with Behavior Research Institute (BRI) v. Leonard (in IBID). In July 1985, a BRI student died while undergoing what the Director of BRI referred to as "aversive therapy" (in IBID). Death, it was later determined was not directly related to the aversive therapy (in IBID). However, the Director of the Massachusetts Office for Children (OFC) ordered BRI to terminate its use of aversive interventions (in IBID). Interestingly, an organization of BRI parents filed a subsequent suit in Massachusetts probate court requesting an injunction against OFC's order (in IBID). The court issued the injunction stating:

> ...the aversive techniques used at BRI produced dramatic results, included appropriate safeguards, and were used no more than necessary...The termination of the procedures would result in irreparable consequences for the student concerned (in IBID).

Of additional importance, however, was that although the court upheld the use of aversive procedures in this case, the legal support cannot be interpreted as blanket approval for such interventions (IBID). There was strong professional disagreement regarding the appropriateness of BRI's implementation of the interventions in question (in IBID). Concerns included insufficient intake data on students, inadequate Human Rights and Peer Review oversight, insufficient research base to support a number of components of the aversive therapy, and inadequate training and supervision of direct care staff (in IBID).

Further, this case exemplified the court's willingness in certain cases to defer to professional judgement on the use of aversives (in IBID). The aversive therapy involved in this case received approval because the available data supported the need for intrusive procedures (in IBID). Also, in the Court's review the procedure did not appear to violate the Eighth Amendment's prohibition against cruel and unusual punishment (in IBID, pp273-274). If a treatment were ever called into legal question, these findings assert that documentation must be precise and complete at all levels in order to legally support a recommendation made by a school or therapist.

As mentioned in the introduction of this paper, associations such as the American

Association on Mental Retardation (AAMR) and it's predecessor, the American Association on Mental Deficiency (AAMD) have published oppositional statements defining what characteristics must be present in order to consider a therapy aversive. In April 1987, the AAMD issued their position statement on aversive therapy, which read as follows:

> ...condemns such practices and urges their immediate elimination. The aversive practices to be eliminated include some or all of the following characteristics: (a) obvious signs of physical pain experienced by the individual; (b) potential or actual physical side-effects, including tissue damage, physical illness, severe stress, and/or death; and (c) dehumanization of the individual, through means such as social degradation, social isolation, verbal abuse, techniques inappropriate for the individual's age, and treatment out of proportion to the target behavior, because the procedures are normally unacceptable for nonhandicapped individuals (1987, p118).

In addition to meeting the above characteristics, the issue of aversives should encompass consideration of the respect for persons, beneficence, and justice (1989, piii). A good starting point for addressing respect, beneficence, and justice in conjunction with aversives is the 1978 Belmont Report on "Ethical Principles and Guidelines for Protection of Human Subjects of Research" (in IBID). Those serving the needs of individuals with characteristics like self-injurious and aggressive behaviors found the guidelines useful as a means of providing a foundation to protect those they were attempting to serve. In late 1978 the U.S. Congress and the President adopted the Belmont Report draft to reflect protection for those individuals involved in the aversives issue.

The Belmont Report based guidelines for setting-up aversive therapies on two ethical convictions: individuals should be treated as autonomous agents and persons with diminshed autonomy are entitled to protection; and every person is entitled to the benefits of treatment and to be free of risk from its negative side effects to the maximum extent possible (in IBID). Autonomy refers to the capacity to deliberate about personal goals and to take actions based upon those deliberations (in IBID). The AAMD adapted the Belmont Report's guiding principles to lay the foundation for their own standards on the aversives issue.

One final note on the issue of behavior modification. Aversive therapy continues to be a hot topic in the field of special education. It is a topic that appears to be growing by the year and one that is not any closer to being resolved. Current concerns come not only from parents, professionals, the AAMR and TASH (The Association for Persons with Severe Handicaps) but the general public as well. This attention has resulted in legislation or initiatives in some states (i.e., California, Florida, Massachusetts, Minnesota and Pennsylvania) that either mandate governance of aversive interventions through the promulgation of rules or even prohibit these techniques (Braaten, 1991, p28). Most recently, an initiative was sponsored to include restrictions and prohibitions in PL 94 - 142 (IBID).

At present, regulations continue to be drafted with the intent of addressing and potentially resolving the aversives issue. It is not certain however if any one resolution can be drafted. Numerous opinions on the issue of the use of aversives exist and no two individuals may be satisfied with imposed regulations or restrictions. With this in mind, it may take years to mediate the questions and concerns surrounding the extent to which punishment and aversive therapies require clarifications. While the debate continues, so does the practice of questionably aversive Behavior Modification techniques.

Vitamin B6 Therapy

Vitamins are complex organic substances found in most foods and are esssential in small amounts for the normal functioning of the body (Sieben, 1977, p139). Their absence from the diet leads to severe-deficiency diseases such as scurvy, rickets, and nervous system degeneration. The effect of vitamins on these diseases has been so spectacular that the public has long been captivated by their importance as part of the daily diet (IBID). Acceptance of vitamins as the virtual elixir of life has fostered a vast cult which believes taking large doses of vitamins will help one achieve a state of super-health (IBID). This mindset has contributed to the advent of megavitamin therapy, which refers to the use of vitamins in quantities up to one thousand times the usual daily requirement (IBID).

Initially, megavitamin therapy was used in an attempt to treat schizophrenia with large doses of niacin (IBID). A major impetus for the current interest in the megavitamin approach was provided by the work of Abram Hoffer and Humphry Osmond (Hawkins and Pauling, 1973, p514). Beginning in 1952, they used massive doses of niacin and ascorbic acid on adult mental patients, primarily schizophrenics (IBID). Review of the literature finds the claims of these and other orthomolecular psychiatrists in the treatment of adult schizophrenia with megavitamins to be lacking in both reliability and specificity (IBID). Further, there have been no exact replications of their studies to support or refute their claims. In any event, this lack of evidence did not deter advocates of orthomolecular medicine interested in investigating the use of massive doses of vitamins. Research included attempts to use vitamins to "remedy" other disorders such as mental retardation, psychoses, autism, hyperactivity, dyslexia, and learning disorders (IBID). The following section will look at those studies involving therapies used with the autistic.

In the early 1960s, Dr. Bernard Rimland, Director of the non-profit corporation Autism Research Institute in California, heard reports from parents of improvements seen in their autistic children after taking certain vitamins (Gerlach, 1993, p39). At the same time they were also hearing of parallel reports from parents and physicians of some twenty children in such widely separated places as California, New York, Massachusetts, Georgia, Washington, Canada, and England (Hawkins and Pauling, 1973, p516). Although skeptical at first, by 1968, Rimland and others felt the available information was encouraging enough to conduct their own research. They sent a form letter to parents on the Institute's mailing list to determine whether others had experienced any differences in behavior or functioning when their children were given different dosage levels of vitamins. Initially known as Form E2, Form E3 (see appendix A) was designed to explore a number of leads concerning severe behavior disorders in children. Included on Form E3 was an expanded section requesting parent and physician remarks on the application and results of any treatments used with their children.

The wide response to this survey resulted in obtaining an additional 57 reports of children, and summaries from seven physicians who had used vitamins in treating children with severe behavior disorders (IBID). Many of the parents had experimented independently; some using as many as nine individual vitamins (IBID). The case reports submitted offered what Dr. Rimland noted were "... striking examples of behavior improvement or deterioration which appeared to be closely associated with the use or cessation of use of vitamins..." (IBID). Even more significant was well over half of the reported cases showed significant improvement (IBID).

From this study, Dr. Rimland was also able to determine that parents and physicians used a great deal of diversity in the combinations and range of doses of vitamins (IBID). There seemed to be a correlation between the use of four particular vitamins which were linked to overall improvements (IBID). Niacin or niacinamide, used with 40 of the 57 cases had been given at levels ranging from 30 mg to 6 g per day; Ascorbic acid, used in 27 cases, ranged from 100 mg to 6 g per day; Pyridoxine (Vitamin B6), used in 24 cases ranged from 5 - 400 mg. per day and pantothenic acid, in 11 cases which ranged from 25 to 900 mg. per day (in IBID).

Although initially cautious with these findings, Dr. Rimland and his colleagues gave credence to the returned forms for the following reasons:

1. Many of these cases represented single clinical experiments conducted

on a trial-and-error basis and largely independent of each other;

2. The children manifested such gross behavorial disturbances that the range in which improvement could show was enormous;
3. Most of the children had already been tried on a number of psychoactive drugs, with negative results or results that were not comparable to that gained from the vitamins;
4. A number of respondents had curtailed or stopped the "vitamin therapy" either deliberately as a check on efficacy or as inadvertant "natural experiments" which occurred for such reasons as the mother's forgetting to buy a new vitamin supply (in IBID, pp517-518).

Rimland et al. decided to conduct their own studies on the use of vitamins. Before doing so, they consulted available research pertaining to the subject at hand. Drs A.F. Heeley and G.E. Roberts were found to be the earliest to publish a report on the use of megavitamin treatments on behaviorally disordered children (in IBID). In their 1965 study of 19 autistic children, 11 of the 19 had been found to exhibit an abnormality of their tryptophan metabolism, determined through urine specimens (in IBID). The researchers gave each of the 11 subjects 30 mg of B6 orally, then reexamined their urine (in IBID, p516-517). Heeley and Roberts reported that the abnormal response of the enzyme system was corrected by B6 administration (in IBID, p517). One child was reported to experience success with the B6 vitamin beyond the experiment (in IBID).

Dr. Rimland and the Autism Research Institute went on to chronicle other studies of high dosage vitamins and the results (see appendix B). Rimland summarized the published studies (listed in appendix B) as collectively having "...proved beyond doubt that a substantial proportion of autistic children and adults showed worthwhile benefits when given a large daily supplement of vitamin B6 (also known as pyridoxine)..." (Rimland, 1988b, p68). Although appendix B does not contain the results of current research, it does give some evidence of the more supportive studies available at the time the list was published.

Significant analysis of the topic should begin with the results of Rimland's 1973 study which followed on the heels of the responses from Form E-3. The subjects were recruited from the Institute's mailing list according to those children who were considered autistic by their parents and pediatricians (1987b, p2). Every child was given the same vitamin regimen. However, the dosages did varying according to the weight of each child (IBID). The children were started on a multiple B vitamin tablet plus several grams per day of vitamin C (IBID). After two weeks, niacinamide and pyridoxine (B6) were added, each in quantities several hundred times the usual dosage (IBID). After two more weeks, several hundred milligrams of pantothenic acid were added (IBID). After three months on the vitamins, a "no treatment" period was instituted to observe any changes in the child (IBID). The final stage involved the vitamins being reinstated while the parents and physicians completed their surveys (IBID).

The results of this study can be found in appendix C. Interestingly, only 3 of the 191 cases were reported by parents and physicians to have "definite, maximum improvement in all areas"(IBID, p4). The bulk of the subjects were reported to fall within the following descriptors: "very good improvement" (38 of the 191 cases); "significant definite improvement" (45 of the 191 cases); "some improvement" (41 of the 191 cases); and "possible improvement" (37 of the 191 cases) (IBID). According to appendix C, note that 27 out of the 191 cases fell within the "no change or some behavior deterioration or much deterioration or great deterioration" categories (IBID).

Due to the length of this project it would be impossible to list all of the available research results. Vitamin analysis studies have also been conducted in other countries including England and France. Further, the length of this project also limits analysis of Dr. Rimland's magnesium component to his vitamin therapy. What will follow will be review of the current instructions Dr. Rimland gives to parents who contact his Institute regarding the use of Vitamin B6 treatments at home. The final part of this section will analyze the pros and cons parents and professionals need to be aware of when trying any form of vitamin therapy.

The current "goals" of Dr. Rimland's vitamin therapy are listed in Gerlach's 1993 Autism Treatment Guide. The first reason to use vitamins with autistic individuals is to normalize body metabolism and improve behavior (in Gerlach, 1993,p40). Studies have shown that Vitamin B6 helps to normalize brain waves and urine chemistry, control hyperactivity, and to improve overall behavior (in IBID). It may also help in reducing the effects of allergic reactions by strengthening the immune system (in IBID). According to Dr. Rimland, although improvements vary considerably among individuals, other possible improvements from B6 therapy are: speech improvements, improved sleeping patterns, lessened irritability, increased span of attention, greater desire for learning, decrease in self-injury and self-stimulation and overall improvement in general health (in IBID).

Dr. Rimland currently refers interested parents to contact the Kirkman Laboratories in Wilsonville, Oregon to purchase their marketed megavitamin product, Super Nu-thera. The formula, which is available both in powder and capsule forms was designed to contain the vitamins and minerals Dr. Rimland and others have found necessary for placing a child on megavitamin therapy (see appendix D) (Rimland, 1993g, p1). The powder contains 500 mg of B6 per heaping teaspoon, versus the six capsules required to equal one heaping teaspoon of the powder (IBID). Dr. Rimland notes the treatment generally costs between 4 and 20 dollars per month, depending on the amount needed and whether the capsules or powder are used (IBID).

Determining the correct dosage, according to Dr. Rimland "...is an individual matter, and must be done by careful trial and error" (IBID, p2). Recommended daily levels are based on weight: autistic children between 40 - 60 pounds, a level teaspoon per day (or 3 capsules); children between 60 - 100 pounds, one heaping teaspoon of powder or 6 capsules; and for larger children or adults, one and one half to two teaspoons per day (IBID). Dr. Rimland adds "...most children on megavitamin B6 therapy need between 250 mg (3 capsules) and 750 mg (9 capsules) per day of vitamin B6 along with other nutrients in normal amounts,...rarely does anyone...need over two heaping teaspoons or 1,000 mg per day" (IBID). It is also recommended to divide the day's dosage into one-thirds and to give with each meal (IBID). To begin dosage, the parent would start the child on one fourth the suggested level and gradually increase the amount over a period of a week (IBID).

Perhaps one of the most critical factors creating concern over Vitamin B6 therapy is the safety involved when increasing vitamin intake. " For decades", according to Dr. Rimland, "vitamin B6 has been considered to be perfectly safe, even when taken in very large amounts" (IBID). Rimland sights a 1966 American Academy of Pediatrics claim that "...to date there has been no report of deleterious effects associated with the oral ingestion of large doses of vitamin B6 (0.2 to 1.0 grams per day)" (in IBID). However, a 1983 report by Schaumburg et al. reported significant, though not permanent nor life-threatening side-effects in six patients who had been taking 2,000 to 6,000 mg per day of vitamin B6 (in IBID). The side effects were numbness and tingling in the hands and feet; the foot numbness in one case interfering with walking (in IBID). In a rebuttal statement, Dr. Rimland added:

> ...these patients were not taking magnesium, the other B vitamins, nor any of the other nutrients that must be taken if one is taking large amounts of B6...the Super Nu-Thera formula was designed to prevent the kinds of side effects Schaumburg et al. reported....it seems likely that the adverse reactions were not due to B6 'toxicity' but to deficiencies of magnesium and the other B-vitamins induced by taking large amounts of B6...Many hundreds of autistic children have taken Super Nu-Thera with no significant adverse effects reported (IBID).

Interestingly, the Schaumburg et al. 1983 report attracted an enormous amount of attention and media coverage. Reader's Digest carried an article on vitamin B6 and how it had been found to be toxic (in Rimland, 1987b, p13). Rimland refuted Schaumburg et al.'s claims that any evidence existed that Vitamin B6 is dangerous, provided the other vitamins are introduced (IBID). Dr. Rimland further asserted "...if extra B6 helps an autistic child, it helps only because that child requires more B6 than does a normal child" (IBID, p14). Rimland stated that far more individuals die from use of prescription drugs and "...vitamin B6 in very high doses is in fact used to save the lives of people who have taken otherwise lethal overdoses of certain drugs" (IBID).

Medical critics assert there is nothing natural about extremely high doses of vitamins (Sieben, 1977, p140). Robert Sieben notes "...this therapy appears to be based on the assumption that, if a small dose of something is good, a larger dose must be better" (IBID). Further, medical critics also warn potential users to"... consider that little attention has been given to the potential toxicity of vitamins... no one anticipated that public figures would promote something as extreme as megavitamin therapy" (IBID). According to Sieben (1977), "no one has published data supporting the theory that deficiencies in one or more...elements may result in learning disabilities; yet children are being subjected to replacement therapy" (IBID).

Despite such contradictions, Dr. Rimland continues to advertise his Vitamin Therapy through publications from the Autism Research Institute. Parent accounts are published citing "...Charlie's improvement was immediate...stopped having seizures...doing so much better...has become very aware of people..." (Woodward, 1980, pp2-4). Dr. Rimland also comments on parents giving the highest ratings to vitamin B6's safety and efficacy in his follow-up questionnaires (Rimland, 1987b, p13). However, a report by the Committee on Nutrition of the American Academy of Pediatrics concluded that "megavitamin therapy as a treatment for learning disabilities and psychoses in children, including autism, is not justified on the basis of documented clinical results" (Shaywitz et al., 1977, p1750).

It is easy to see how people can be persuaded into trying vitamin therapy with an autistic child. The goal of vitamin therapy seems initially inviting as a treatment. After all, the medical profession offers parents little alternative to improving the lives of their autistic children. Although studies have shown that vitamin B6 helps to improve overall behavior, parents as consumers of a vitamin product like Super Nu-thera product should be cautious. Too many medical professionals and associations do not support introduction of increased dosages of vitamins into the body. With this in mind, lack of support should leave vitamin therapy too questionable to be considered.

Doman-Delacato treatment

The 1960s gave breakthroughs in the treatment of children with brain injuries (Gerlach, 1993, p75). Two important contributors to the field were Glenn Doman and Carl Delacato. In the early 1960s, they founded the Institute for the Achievement of Human Potential in Philadelphia, along with Robert Doman. It was at this Philadelphia location that Doman and Delacato had done a majority of their research. They also worked with children with brain injuries with the neurosurgeon, Dr. Temple Fay, at his

Neurological Rehabilitation Center in Philadelphia (IBID).

Years of research led the team of Doman and Delacato to conclude that there were many forms of brain injury, the form depending upon the area of the brain affected and the extent of the damage (IBID). The Institute labeled children according to their brain organization: Mild- suffering from perceptual problems; Moderate- able to move and make sounds; Severe- unable to move or make sounds, obvious lack of bodily functions (in IBID, p76). Such a theory greatly departed from other theories of the time (IBID). The approach of the time was that brain injury effected the brain from an all-or-nothing standpoint, versus a tiered grouping Doman and Delacato were suggesting (IBID). Doman and Delacato believed that such damage might have been caused by lack of oxygen during the birth process, by a high fever during the early period of the child's brain development, or for other reasons (in IBID).

Doman and Delacato also departed from their peers' beliefs by asserting that brain injury was not entirely incurable (IBID). Their research led them to conclude that, in order for children to reach their full potential, certain natural stages of development had to occur (In IBID). To evaluate each stage, they tested six major areas of development: vision, hearing, tactility, mobility, function of the hands and feet, and language (in IBID). They maintained that a child could not skip one stage and be expected to achieve full potential in the following stages (in IBID). This is how they believed they could help the brain injured.

The Doman-Delacato theory was based on neurophysiological restraining. Neurophysiological restraining was the idea that one can improve the function of a part of the central nervous system by stimulation of specific sensory inputs, thereby eliciting specific motor output patterns (Sieben, 1977, p141). The Doman-Delacato theory held that the brain could only develop properly if it were used (in Gerlach, 1993, p77).

To treat children or adults brought to them for help, Doman and Delacato devised ways to let their clients reexperience the normal stages of development (in IBID). This was achieved by stimulating the brain through movement of the body (in IBID). For instance, if children could not walk well, Doman and Delacato gave them the opportunity to learn to crawl (in IBID). This was how the Doman-Delacato treatment became referred to as "patterning". "Patterning" can be defined as the manipulation of someone's body in imitation of creeping or crawling movements when the person is unable to make the movements on their own (in IBID). Patterning involved many hours of therapy each day for an extended period of time. As will be discussed in a future section of this paper, sensory integrative therapy was also based on the principles of patterning.

Doman-Delacato claimed this "patterning" of the nervous system was useful for (1) achieving greater ability in patients with brain damage; (2) treating communicative disorders such as visual, speech, and reading disabilities; (3) enhancing intelligence; and (4) preventing communicative disorders, altering deviant behavior, and improving coordination in normal subjects (in Sieben, 1977, p141). According to their theory, the great majority of cases of mental retardation, learning problems, and behavior disorders were caused by brain damage or "poor neurological organization" (in the American Academy of Pediatrics, 1983, p41). Doman and Delacato both supported their claims in separate books published in 1974; Doman's book, What to do About Your Brain-Injured

Child, and Delacato's book, The Ultimate Stranger.

Another innovative area of thought was that Doman and Delacato emphasized the role of parents in carrying out treatment procedures at home with their children (IBID, p40). This theory of home programming was introduced long before such programming developments as early intervention, parent training programs and legislative mandates were issued for parental participation (in IBID). By actively engaging parents, Doman and Delacato offered hope when most of the professional community offered very little (in IBID). Unfortunately, not many others felt the same way about this treatment.

Since the introduction of the Doman-Delacato "patterning" treatment, a number of organizations have issued cautionary statements regarding the treatment's claims. A formal statement by the consortium of American and Canadian organizations was published on June 1, 1968 along with the American Academy of Pediatrics (in IBID). In making this statement, the American Academy of Pediatrics felt they had been forced to update and modify their position on the Doman-Delacato treatment and to propose some recommendations (in IBID). Their reasoning behind their statement were largely due to the media coverage the Doman-Delacato treatment had been receiving as well as an increased number of inquiries from parents and public officials (in IBID).

Other reasons for concern were numerous. For instance, many parents felt the promotional methods employed by the Institute made it difficult to refuse the treatment (in IBID). Many parents experienced a similiar feeling of having their own motivation and adequacy as parents called into question if they attempted to refuse the treatment (in IBID). The parents also reportedly felt a great deal of pressure and stress (in IBID). In interviews, the parents overwhelmingly attributed their concern to what they had described was a prescribed regimen that was both "demanding and infelxible" (in IBID). Over time these concerns caused some parents to question whether they had been neglecting the needs of other family members (in IBID).

It was also reported that Doman and Delacato practiced other ways to increase the anxieties of already-burdened and confused parents (in IBID). Without supporting data, Doman and Delacato indicated many typical child-rearing practices were" limiting to a child's potential" (in IBID). Having made such a blanket statement, Doman and Delacato were leading parents to call into question their inabilities to adequately meet the developmental needs of a growing child. According to the American Academy of Pediatrics' 1968 statement, "notwithstanding these dramatic claims, we are aware of only one study since 1967 that has suggested small functional improvements in some patients receiving patterning" (in IBID). The fact that virtually no new data was presented to support the Doman-Delacato treatment led the American Academy of Pediatrics to question their extensive claims (in IBID).

Since its introduction, results published by or for the Institute have been inconclusive (in IBID, p41). Many reports of improvement in reading ability after treatment have been heralded as support for the theory, but statistical analysis have revealed few demonstrable benefits (in IBID). Furthermore, some of the cases dramatically publicized by the Institute had involved children with traumatic brain damage or postencephalitis, who according to the American Academy of Pediatrics have the potential to make substantial gains without any special treatment (in IBID).

The conclusive summary of the American Academy of Pediatrics was damaging. The summary cautioned physicians and therapists to acquaint themselves with the issues in the controversy and the available evidence (IBID, p42). Accordingly, the American Academy of Pediatrics concluded:

> based on past and current analyses, studies, and reports, we must conclude that patterning treatment offers no special merit, that the claims of its advocates are unproven, and that the demands on families are so great that in some cases there may be harm in its use (IBID).

According to Sieben, a careful review of the theory has led to the conclusion that "the tenets are either unsupported or overwhelmingly contradicted when tested by theoretical, experimental, or logical evidence from the relevant scientific literature..."(1977, p142).

According to Gerlach, for many today the term patterning conjures up the vision of a 14-hour marathon of volunteers working with a child (1993, p77). However, she commented that unless there were a case involving a truly severe injury, new techniques often require no more than an hour or two of organized programming per day (IBID). For many this was and continues to be at the crux of the controversy. Studies are only now beginning to document that one-on-one tutorials for specific lengths of time can offer results to individuals. Gerlach added, that while there was much controversy about their methods of identification and treatment, Doman and Delacato's term "minimal brain injury" eventually came into vogue (IBID, p76). Unfortunately, Gerlach felt that the term became a catch-all phrase instead of an accurate diagnosis (IBID). Due to this, it's overuse may sometimes lead to improper treatment (IBID).

The 1970's

During the 1970's, the treatment of individuals with special needs was a major concern. The federal courts took an interest in institutional reform, declaring many of their conditions and procedures unconstitutional (Scheerenberger, 1983, p252). A second area of concern involved due process, specifically, the right to trial to represent individual interests (IBID). The 1970s also witnessed review of "involuntary servitude" where residents spent hours meeting the operational needs of institutions (IBID). According to Scheerenberger (1983):

> no other period saw as many humanitarian changes as did the ...1970s: rights, mainstreaming, advocacy, individual plans, interdisciplinary teams, normalization, developmental models, deinstitutionalization, and local, state and federal support...(p254).

Deinstitutionalization was sought as fervently in the 1970s as institutional reform (IBID, p253). According to Scheerenberger, the resident population of state-administered institutions grew from 125,375 to 189,549 between 1950 and 1970 (IBID, p252). President Richard Nixon set a national goal of reducing institutional populations by 30 percent before the turn of the century (IBID, p253). Over the years, success in this area has taken place due to the reduction of residents by as much as 50,139 persons in state-administered institutions (IBID). Yet despite the above improvements, those served by the special education community continued to be subjected to the research and implementation of controvesial treatments. The following is a look at those "curative treatments" introduced during this decade.

Auditory Integration Therapy

Auditory problems are commonly reported by autistic individuals. Recent research has been directed at a number of hearing and other ear-related difficulties including hypersensitivity, painful hearing, unresponsiveness to certain sounds, inability to modulate certain sounds leading to excessive stimulation, delays in auditory processing, and abnormal processing of sounds in the brainsteam as well as in higher centers in the brain (Rimland and Edelson, 1992, p1). These areas of auditory dysfunction have been linked to behavioral and attentional problems as well as difficulties in speech, language, and comprehension (IBID).

One auditory problem that has been widely recognized as affecting a substantial proportion of autistic individuals is hyperacusis (i.e., excessive auditory sensitivity) (IBID).. Since 1964, responses from over 14,000 parent questionnaires collected by the Autism Research Institute have indicated that approximately 40% of autistic children exhibit at least some level of hyperacusis (IBID). According to Rimland and Edelson, as of 1992 Williams Syndrome is the only other disorder known to have a larger percentage (95%) of those classified troubled by hyperacusis (IBID).

For the most part, the causes of hyperacusis have been and continue to remain unknown (IBID). With the exception of using ear plugs or ear covers (Delacato, 1974) or administering supplements in magnesium-deficient cases (Rimland, 1974), there were no treatments available to alleviate those suffering from hyperacusis (in IBID). The late 1960s to early 1970s brought the introduction of a therapy claiming to target the symptoms of hyperacusis. Dr. Guy Berard, at his clinic in Annecy, France pioneered what came to be known as Auditory Integration Therapy or AIT (in Gerlach, 1993, p65). Interestingly, a number of Dr. Berard's autistic patients had come from the U.S., and many of these families had been in contact with Dr. Rimland at the Autsim Research Institute (Rimland and Edelson, 1992, p1).

AIT, as developed and practiced by Dr. Guy Berard, entailed 10 hours of listening to electronically-modulated music through headphones (IBID). Therapy sessions were designed to occur over a 10-day period, during two 30-minute sessions per day, with a four hour interval between each session (IBID). Prior to AIT, the trainee's hearing was evaluated audiometrically to identify any sound frequencies which he or she might have heard hyperacutely or above and beyond the normal sound frequency ranges (IBID). The AIT device became known as the Ears Education and Retraining System, or EERS and was manufactured by SAPP of France (IBID).

The electronically-modulated music consisted of an alternating dampening of high and low frequencies on a near-random basis for periods ranging from 250 milliseconds to 2 seconds (IBID, p1-2). The pace of the frequencies were predetermined according to the music being played during the sessions (IBID). The music was selected from tape or CD recordings of quick tempo and high variability music, such as rock, pop, disco and reggae (IBID, p2). Subjects were required to wear headphones during the sessions. If the subject refuses to do so, the stimuli was presented by placing high fidelity speakers 2 1/2 feet from the subject's ears (IBID, p3).

According to documentation, the patients and experimenter were seated in a small sound-quiet laboratory (IBID). Parents were invited to remain in the room with their children, or they could observe the sessions from behind one-way mirrors (IBID). Interestingly, it had been found that more often than not, parents chose to remain outside the room (IBID). However, if a parent did choose to remain with a child who refused to wear headphones, then that parent was required to wear liquid-filled hearing protectors (IBID). Records assert the parent ear protection was not required out of concern for the parents' hearing, but to prevent them in experimental situations from determining whether their child had been listening to processed (experimental group) or unprocessed (control group) music (IBID).

In 1990, Dr. Berard's AIT was introduced as a therapy in the United States. However, it was not until 1991 that AIT was brought to the attention of the general public through the publication of Annebel Stehli's book The Sound of A Miracle: A Child's Triumph Over Autism (IBID). The condensed version hit the stands in Reader's Digest's December 1990 issue (IBID). Stehli generated further AIT publicity by way of appearances on national television shows and in other written publications. As news of this therapy spread, parents of autistic children were demanding information and access to AIT.

In 1990, researchers at Portland State University conducted pilot studies on AIT (Gerlach, 1993, p65). As of 1993, Drs. Bernard Rimland and Stephen Edelson were conducting research on the validity of AIT at the Center for the Study of Autism in

Newberg, Oregon (IBID). The Center alone had tried AIT with over 300 individuals (IBID, p66). According to Gerlach, the tremendous demand for AIT in 1993 had led to the establishment of over 120 AIT practitioners throughout the United States (IBID).

Interestingly, investigation of the literature uncovered another individual, who during the late 1960s, attempted to improve the auditory functioning of autistic persons (Rimland and Edelson, 1991, p1). According to Rimland and Edelson (1991), Dr. Berard had been introduced to the concept of auditory stimulation by another French otolaryngologist, Dr. Alfred Tomatis (IBID). Berard and Tomatis worked together for a number of years but parted company when Berard "...grew quickly disillusioned with what he felt was the excessive cost, time, intrusiveness and emphasis upon hypothetical psychological factors of the Tomatis approach" (IBID).

Tomatis called his therapy the Listening Training Program or LTP. According to Tomatis, the LTP's aim was to correct very basic neuropsychological and underlying affective processes (in Kershner et al., 1990, 944). These processes, according to Tomatis play an important role in psycho-social development and had their first behavioral effects on children's feelings about themselves (in IBID). The LTP program of auditory training primarily involved treatment using what Tomatis called the" Electronic Ear" (in IBID, p45). The Electronic Ear was an audio-vocal conditioning apparatus which had an input stage (cassette or child's spoken voice through a microphone), an output stage (child wears audio headsets with bone conductors), and two parallel frequency-modification channels in between (in IBID). According to Tomatis, the Ear produced its beneficial therapeutic effect by increasing tympanic pressure and by exercising the inner-ear muscles of the tympanum, the malleus and the stirrup bone (in IBID).

Tomatis attributed his acoustic exercise to increasing the linguistic processing specialization of the left cerebral hemisphere (in IBID). An attempt was made in the Listening Training Program to establish three stages of auditory experience, which Tomatis characterizes in the normal development of listening (in IBID). During the first two stages of LTP, known as "Filtered Sound" and "Sonic Bath", the child listened to recordings of classical music and Gregorian chants (in IBID). The first phase was designed to present the frequencies that Tomatis theorized would be heard through the liquid environment or amniotic fliud barrier of the unborn child (in IBID). These recordings were filtered to exclude frequencies under 8,000 HZ (in IBID). In brief, hertz is a term used to describe the unit of frequency of a sound (Bess and Humes, 1990, p26). Tomatis believed this experience to be a duplication and a psychodynamic recapitulation of what the child heard and felt before birth (in Kershner et al., 1990, p44).

In the second phase, the child was considered to be "reborn" into the full spectrum of the acoustic world by reintroducing the extrauterine frequencies between 1.5 and 8,000 Hz (in IBID). In the third and longest phase, the "Active phase", the child would respond orally to sound by repeating taped messages, by listening to classmates as they read, and by reading and speaking aloud into the Ear (in IBID). During this phase, the intensity of the feedback to the left ear was curtailed and the lower-band audio frequencies were filtered as the higher (speech) frequencies were heightened correspondingly (in IBID).

According to Kershner et al. (1990), Tomatis claimed that such procedures, when applied clinically, had been remarkably successful in remediating a broad spectrum of auditory, linguistic, and academic deficits in thousands of learning disabled children (in IBID). Tomatis also claimed LTP boosted motivation and self-esteem (in IBID). In 1986 Kershner et al. performed a two-year evaluation of the LTP with 32 learning disabled children (in IBID, p50). According to Kershner et al., their two-year evaluation, which included a detailed analysis of pretest to follow-up changes, failed to produce any supportive evidence for the LTP (in IBID). Subsequently, the only treatment effect to emerge was a greater gain in the study's placebo group on the Seashore Rhythm test; a basic processing measure of auditory attention, auditory discrimination, and short-term auditory, sequential memory (in IBID). This finding was critical because the Seashore was being recommended specifically by Tomatis consultants to offset the sensitivity to the underlying auditory-processing changes that resulted from LTP treatment (in IBID).

Kershner et al.'s study further pointed out the fact that the placebo group improved more than the LTP group (in IBID). This may have suggested the LTP may delay or interfere with learning disabled children's progress toward acquiring certain fundamental auditory skills (in IBID). Kershner et al. stated

> ...although there is no indication of a regression in auditory capabilities, the LTP children's relative lack of progress occurred parallel to that group's poorer performance in phonics in our Year-1 report...these findings both reflecting superior functioning of the placebo group compared to the LTP in significant auditory-

> processing skills, warrant a note of caution...the ineffectiveness of the LTP as indicated by our research is limited to specific conditions of the experiment including setting, the students, and the 100-hour modification of the LTP (in IBID).

On the reverse side, Kershner et al. pointed out a highly positive side to their research. "The results showed that LD children do not necessarily fall increasingly behind their nondisabled peers..." but instead progressively narrowed the ability-achievement discrepancy that defines their impairment by showing a linear improvement in both written and oral language (in IBID, pp50-51). Strong gains were shown over the two years in verbal fluency, auditory processing, phonemic blending and in the ability to discriminate sequentially presented musical patterns (in IBID, p51). Additional evidence also supported the possibility that self-concept not only improved substantially but may have improved up to a level that is anticipated among nondisabled children (in IBID).

According to Gerlach (1993), parents of children who have received Auditory Integration have noted a variety of improvements (p 65). Some felt it has made little difference in their child's behavior, while others have noted significant changes after their child received AIT (IBID). Other positive changes which have been reported included increases in eye contact, spontaneous speech, socialization, attention span, and a lessened sensitivity to certain sounds (in IBID).

Kershner et al. cautioned that the children in their study modeled after Tomatis' Listening Training Program "... were not cured; they are still learning disabled..."(1990, p51). "Such programs (Berard's AIT and Tomatis' LTP) share the deceptively attractive feature that they promise what readily available procedures cannot - optimism about reversing the academic deficiencies of learning disabled children" (in IBID, p43). According to Dr. Rimland, more scientifically-controlled studies must be performed in order to make it possible to state with assurance whether or not auditory training may be considered to be effective for children with (learning disabilities and) autism (Rimland, 1992).

Experts are still not certain why or how AIT or LTP have seemed to reduce hypersensitivity for some individuals (Gerlach, 1993, p67). Theories at this time, which have not be scientifically validated, suggest that AIT and LTP might reduce sound sensitivity: either by eliminating peaks in hearing through filtration; by providing ear exercise; by massaging the inner ear and stimulating an acoustic reflex in the middle ear; by stimulating the brain; and/or by giving the person a chance to get used to loud sounds (in IBID). Their effectiveness may also lie in the sensory stimulation that AIT and LTP provide to both the auditory system and the brain, and in the reduction of distracting background noise in the ears (In IBID). In the long run, manipulation of sound waves may or may not improve the prognosis of a learning disabled or autistic child. Interested parents and professionals must approach this therapy accordingly.

Sensory Integration Therapy

Sensory refers to all types of input that are delivered to the brain (Vezle, 1975, p345). The process of the brain to organize and interpret this information is known as sensory integration (IBID). According to A. Jean Ayres, sensory integration is the most important type of sensory processing (Ayres, 1972 ,p5). The brain must locate, sort, and order the incoming sensations in order to use these sensations to form perceptions, behaviors and learning (IBID).

According to Gibson (1966), there are five principal perceptual systems: basic orienting, haptic, the taste-smell, auditory and visual (in Solan & Groffman, 1982, p168). The information the brain receives from these systems is integrated with other information coming from the entire nervous system, motor activities, and other perceptual systems (IBID). Nerve cells near the skin surface, called exteroceptors, receive the sensations of touch, pain and temperature (Vezle, 1975, p345). The special sense involved with vestibular or equilibrium (moving or being moved in space) also belongs to the exteroceptors which deliver messages from outside of the body (IBID). Other sensory nerve cells, called interoceptors, retrieve from inside the body, sensing hunger and body temperature (IBID). Proprioceptors exist in and around joints, in muscles, in the palms of the hands and soles of the feet, and in the inner ear, delivering information.of muscle action and joint movement and posture to the brain (IBID).

Ayres believed the genes of the human species give us our baseline capacity for sensory integration (Ayres, 1972, p6). Although every child is born with this capacity, he or she must develop sensory integration by interacting with many things in the world and adapting his body and brain to many physical challenges during childhood (IBID). According to Ayres, the greatest development of sensory integration occurs during what she referred to as an adaptive response (IBID).

An adaptive response is a purposeful, goal-directed response to a sensory experience (IBID). For example, many adults see the process of childhood play as nothing more than that (IBID). However, in an adaptive response, we master a challenge and learn something new (IBID). At the same time, the formation of an adaptive response helps the brain develop and organize itself (IBID). Thus, according to Ayres, "while children are playing, they are developing skills that are essential to subsequent thought processes for academic success" (IBID, p7).

Perception is another process tied to the sensory. Perception is the active process of locating and extracting information from the environment (Solan & Groffman, 1982, p168). It is the core process in the acquisition of cognition and knowledge and is basic to learning and thinking (IBID). Learning facilitates the perceptual process of extracting information, since the acquired and stored data is used as a model against which newer environmental data is measured (IBID). Thus, the easier it is to extract information, the easier it is to learn (IBID).

Research has determined that the process of sensory integration takes place in many parts of the brain (Vezle, 1975,p346). As much as 80 percent of the sensory input goes directly to the reticular system (IBID). The reticular system is a large network of neurons of all sizes with many connecting fibers to distribute the impulses to the necessary areas of brain (IBID). Sensory integration occurs deep within the brain, at unconscious levels (IBID). This is due to the brain having a filtering or inhibitory system which reacts to sensory impulse change (IBID). Only certain impulse changes or sufficient amounts of change are sent to the conscious, outer levels of the brain (IBID).

The historical background of the currently-used sensory integration dates back to Temple Fay and his work in the 1950s (IBID). Fay, basing his ideas on the work of Sherrington, developed a neuromuscular treatment approach involving passive movement to develop patterns of muscle activity (IBID). G. Doman and C. Delacato expanded Fay's work. Doman and Delacato's approach included passive, followed by active movements (IBID, pp346-347). Doman and Delacato's "patterning" therapy was already discussed in greater detail in the end of the 1930's-1960's section of treatments.

A. Jean Ayres in some fifteen years of research in perceptual and sensory integrative deficits, focused her work on the more basic levels of brain functioning (in IBID). Ayres defined sensory integration as the organization and interpretation of sensory stimuli for an adaptive response (Clark & Shuer, 1978, p227). She developed a sensory-motor treatment technique called Sensory Integration therapy. It was designed to be diagnostic and prescriptive in nature, meaning the treatment goals were consequent and logically related to interpretation (IBID).

Inherent to sensory integration is the relationship between learning and central nervous system functioning. Normal learning requires normal learning system functioning. (IBID). A. Jean Ayres theorized that children with learning and behavior problems do not possess intact or properly functional central nervous systems (Gerlach, 1993, p87). Dr. Ayres pioneered the theory that some children suffer from a neural disorder that causes the nervous system to receive incoming information, via the senses, in an inefficient manner (IBID). This disturbance, called Sensory Integrative Disorder, may be present in some individuals with autism (IBID).

When sensory integration does not develop normally in a child, a number of difficulties may arise. Indicators of sensory integrative dysfunction may include oversensitivity to touch, movements, sights, sounds; underreaction to sensory stimulation; unusually high or low levels of activity; coordination problems; delays in speech, language, and motor skills; behavior problems; and poor self concept (Gerlach, 1993, p88). In short, an individual who may be hyperactive, distractible, and impulsive in their behavior could lack sufficient inhibition of the extraneous sensory input (Vezle, 1975, p346). Too often emotional problems accompany difficulties in perceptual skills and motor abilities (IBID, p348). These external factors have led parents and professionals to suspect sensory integrative problems.

According to Sensory Integration theory, when a child experiences such difficulties, an evaluation should be conducted to determine any underlying integrative dysfunctions (IBID). Specialists trained in Ayres' treatment techniques can use one of a number of tests designed to look at postural reactions, eye-hand usage and coordination, including but not limited to the Southern California Sensory Integration Tests (SCSIT), the Southern California Postrotary Nystagmus Test (SCPNT), and other clinical tests (Clark & Shuer, 1978, pp227-228). In addition, structured observations could be used to record response to sensory stimulation, posture, balance, coordination and eye movements (IBID). The therapist is trained to make recommendations regarding appropriate therapy only after carefully analyzing the test results, other assessment data, and information from professionals (i.e., classroom teacher) and parents (IBID).

If Sensory Integrative therapy is recommended, the child will be guided through a sequence of activities. These activities are designed to challenge his or her ability to respond appropriately to sensory input by making a successful, organized response (IBID). Training of specific skills is not usually the focus of this kind of therapy (IBID). Adaptive physical education, movement education and gymnastics are examples of services that typically focus on specific motor skills training (IBID). Such services are important, but they are not the same as therapy using a cumulative sensory integrative approach (IBID).

One important aspect of a therapy that uses a sensory integrative approach is that the motivation of the child plays a crucial role in the selection of the activities (IBID). A child who is attentive and interested with completing chosen activities will be more successful when completing that task. Also important is the therapeutic recommendations must be individualized and based on the child's strengths and weaknesses (Spyropulos in IBID, p12). Examples of general classroom considerations include consistent structure of time and of physical space; striving to minimalize environmental sensory overload; adjustment to proper desk and chair height; and observation of children who provide a behavioral response or appear uncomfortable with touch (IBID).

Therapeutic intervention using sensory motor integration theories include activities focusing on the tactile, proprioceptive, and vestibular systems (Reynolds & Mann, 1987, pp 1423). In 1975, Ayres noted that treatment for tactile imbalances might include activities that concentrate on stimulating the senses through touching and rubbing different surfaces (IBID). Activities designed to stimulate the proprioceptive system include use of scooter boards (IBID). Finally, vestibular system stimulation can be carried out through activities such as swinging, spinning, and being rolled on a large ball (IBID).

Interestingly, research has been conducted to determine whether sensory integrative skill acquisition can be predictive of success in certain areas of academics. According to Whiton, Singer & Cook (1975), a previous body of research exists which confirmed that competent and poor readers differed in their ability to integrate sensory information in the visual and auditory channels (p79). However, when it comes to reading skills acquistion, controversy exists as to the relative importance of sensory integration skills occurring across modalities and within modalities (IBID). Supporting evidence comes from studies indicating that measures of cross-sensory integration skills correlate significantly with reading achievement at various grade levels (IBID). Moreover, other studies indicate that only measures of audiovisual integration contribute significant independent variance to the multiple correlations between different sensory tasks and reading (IBID, p80).

In contrast, the results of another group of studies have suggested that intra-sensory rather than cross-sensory skills might be better predictors of reading acquisition (IBID). In 1971, McNinch found that auditory memory had more weight in prediction of reading than audiovisual perception (in IBID). Comay (1972) found that in comparison to audiovisual integration, intra-sensory visual perception was more crucial to reading in the second grade (in IBID). In addition, Katz & Deutsch (1964) reported that while cross-sensory integration was important to reading in first grade, by the third and fifth grades, poor auditory perception was the major characteristic of poor readers (in IBID).

In 1975, Whiton, Singer & Cook designed a study to further investigate the relative importance of intra-sensory and cross-sensory integration skills for the acquisiton of reading (IBID, p81). Before doing so, they took into account a number of points they found to detract from the previously mentioned studies. They felt it would be impossible to determine the relative importance of reading skills acquisition by only measuring memory and attention like the previous studies had (IBID). Further, Whiton et al. found the previous research failed to use comparable tasks when comparing intra-sensory and cross-sensory integration abilities (IBID).

The subjects chosen for the Whiton et al. study were 64 white, middle class boys enrolled in the second semester of first grade at three private schools in New York City (IBID, p81). According to school records, none of the boys had uncorrected visual or hearing problems (IBID). All were on a comparable first grade reading level (IBID). Whiton et al. found that the level of difficulty of the sensory integration tasks used in their study varied according to both the timing of presentation of the sensory stimuli and the sequence of sensory input (IBID, p86). Another important result, and one that supported the findings of Gebhard and Mowbray (1959) was that simultaneously presented stimuli resulted in fewer errors in sensory integration (in IBID).

The Whiton et al. findings supported the position that the ability to integrate sensory information across different modalities was an important skill for reading acquisition (IBID, p88). They determined that if only one sensory task were to be used to predict the acquisition of reading, cross-sensory audiovisual tasks would be the best single choice (IBID). However, if several tasks were to be used, the prediction of overall reading skills would be significantly improved by using a combination of audiovisual integration tasks and intra-sensory visual and auditory tasks (IBID).

In summary, Whiton et al. found that further studies were warranted as to the predictive measurement of sensory integration skills for subsequent reading achievement between kindergarten and first grade readers (IBID, p89). They could substantiate nothing in this area beyond Kahn & Birch's 1968 finding that the correlation between cross-sensory integration and reading were lower for children in third and fifth grades than for children in first (in IBID, p88). This included providing no further data on the relationship between first grade sensory integration skill and third or fifth grade reading skills (IBID, p89).

In 1989, Diane Parham attempted to investigate the relationship of sensory integrative functioning to academic achievement in elementary school children (in IBID). She examined the changing relationship of sensory integrative achievement across a four-year period (IBID). The strongest relationships between sensory integrative performance and achievement were found for arithmetic (IBID). It was determined that scores on the Sensory Integration and Praxis Tests (SIPT) were most strongly related to arithmetic at younger ages (in IBID). However, the strength found in the arithmetic scores were shown to decline as the child aged (in IBID). The reverse pattern was found for reading (in IBID).

Proponents of Sensory Integration have noted that the therapy will increase a child's ability to integrate sensory information efficiently (Gerlach, 1993, pp88-89). Other possible benefits have included improvements in motor coordination, language development, reduction of "hyper" or "hypo" responsiveness to sensory stimuli, better emotional adjustment, and self-confidence (IBID, p89). These and other benefits can be reviewed in newsletters and other mailings by writing to Sensory Integration International of Torrance California. Other supporters who provide information to the public include: The American Occupational Therapy Association in Rockville, Maryland; Center for Neurodevelopmental Studies in Phoenix, Arizona; and the North American Riding for the Handicapped Association (IBID).

Medical professionals caution there is no convincing evidence that mastering such tactile and postural skills carries over into academic skills such as reading (Sieben, 1977, p143). According to Sieben, "Sensory Integration as a possible therapy is a theory based on a plausible explanation of the relationship between observed facts" (IBID, p142). According to Sieben,

> ...as a working hypothesis it serves to organize our thinking about a subject and point the way toward further research to test its validity. But it can scarcely be considered a guide to action until it has been proven a fact. The lack of any post-mortem studies or accepted signs of brain stem malfunction must lead one to question Ayres' theory. Ayres further proposes that carefully controlled stimulation through vestibular and somato-sensory (position awareness) systems somehow improves the

> brain stem's integration.... Just how stimulating these systems in certain ways is supposed to make them form the right nerve connections is not made clear (IBID, pp142-143).

Other professionals outside the realm of Occupational and Physical Therapies find Sensory Integration Therapy to offer the field diverse treatment opportunities. Some professionals and researchers agree it may be important to include the senses in a more comprehensive approach to learning. However, unsubstantiated claims limit wide acceptance and practice of this therapy. Skeptics feel more extensive research will need to be conducted before some of the proposed techniques (such as brushing a tactilely-defensive child) will achieve mainstream acceptance. Until SIT earns greater validity, it will remain a less professionally-accepted therapy.

The Feingold Diet

Dietary treatments have been considered to be a major cause of hyperactivity and learning disabilities (Sieben, 1977, p134). According to this theory, all foods containing additives, dyes or natural salicylates are to be excluded from the diet of the hyperactive learning disabled children (IBID). The role diet and allergies play in the life of a child or adult with differing degrees of learning disabilities is probably one of the most significant, yet least understood areas of treatment (Gerlach, 1993, p51). It is this area of treatment, however, which tends to be one of the least empirically supported (IBID).

Historical background on the correlation between food allergies and behavior problems can be traced back to Rowe in the 1930s (Pescara-Kovach & Alexander, 1994, p142). Rowe made the earliest link between food allergies and overt physical symptoms such as rashes and swelling (in IBID). In the late 1960s, mental health professionals turned their attention towards renewing Rowe's interest in the effects of food-based allergic reactions (in IBID). However, the focus of this renewed interest shifted from overt physical reactions to the effects of food on behavior (in IBID). By the 1970s and into the early 1980s, several different theories were receiving widespread media attention and favorable responses from the general public. The following section will examine a few of the dietary interventions and also discuss the methods used to inform the public of the findings.

The theoretical basis of controlling the diet of learning disabled children was developed by Benjamin Feingold, MD. In his book, Why Your Child Is Hyperactive, published in 1975, Feingold reported that the Kaiser Permanente (K-P) diet could control the behavioral disturbance hyperkinetic children (in Burlton-Bennet & Robinson, 1987, p331). Feingold specifically stated that children with learning and behavioral disturbances have a natural toxic reaction to artificial food colors, flavorings, preservatives, and other substances that are added to foods to enhance their shelf life (in Reynolds & Mann, 1987, p656). The Feingold diet was designed to be an additive-free dietary regimen that attempted to eliminate artificial flavorings, colorings, and even several nutritional fruits and vegetables containing salicylates (IBID).

According to Feingold, questionable products included all products containing any form of almonds, apples, apricots, berries, cherries, grapes, oranges, peaches, plums, tomatoes, cucumbers, luncheon meats, and colored cheeses, as well as most breads, cereals, bakery goods, desserts, candies and beverages (in Sieben, 1977, pp134-135).). Other items which made the list included mustard, catsup, oleomargarine, and colored butter (IBID). According to a food preparation guide in the Feingold Cookbook, parents are advised to make their own bakery items, ice cream, candies, mustard, and chocolate syrup (Feingold & Feingold, 1979). Other limitations included no use of tooth paste, mouthwash, cough drops, perfume, pediatric medications and vitamins (in Sieben, 1977, p135).

In 1973 at a meeting of the American Medical Association, Dr. Feingold, a pediatrician and allergist presented his K-P diet. He reported that food additives were responsible for the hyperactivity in 40 to 50% of the hyperactive children he had seen in his practice (Rimland, 1983, p331). Feingold also claimed his additive-free diet to be effective in treating other handicapping conditions, including mental retardation, autism and conduct disorders (in Reynolds & Mann, 1987, p656). Such a claim quickly left Dr. Feingold at odds with both the medical profession and the packaged food industry (Rimland, 1983, p331). According to Dr. Rimland, "Feingold had no idea that his report would raise the storm of controversy that ensued and did not imagine that the remaining nine years of his life would be spent in defending his claims" (IBID).

The media aided in the proliferation of the idea of a connection between food and hyperactivity (Pescara-Kovach & Alexander, 1994, p142). The Washington Post publicized Feingold's reports on October 29, 1973 (IBID). Senator Glen Beall of Maryland, upon reading the news item in the newspaper, requested it be reprinted in the

Congressional Record of the U.S. Senate on October 30, 1973 (IBID). At the same time, the California State Department of Education supported the spread of Feingold's theories throughout the California public schools (Sieben, 1977, p135). In early 1974, Feingold again suggested that food additives contributed to hyperactivity at another meeting of the American Medical Association (Pescara-Kovach & Alexander, 1994, p142). This notion was reported to have spread so rapidly through the medical profession that by September of 1974, Feingold spoke on the topic in a symposium in London, England (IBID). By this time the majority of the public were aware of the hypothesis that linked additives to hyperactivity (IBID).

Feingold alerted the public to the fact that at the time there were more than 2,700 food additives present in food (in IBID). Specifically, over 80% of these additives were artificial colors and flavors that Feingold deemed carcinogenic (in IBID). Consequently, he concluded that such colors and flavors possessed an inherent potential for producing adverse effects (IBID). Feingold further claimed that adverse reactions to food additives had not been reported generally because "...people were naive to the connection between these substances and negative behaviors" (in IBID).

The additive that was primarily implicated by Feingold was a yellow dye known as tartrazine or FD&C No. 5 (IBID, p143). Those individuals allergic to acetylsalicylic acid were said to react adversely to this dye (IBID). Feingold also recommended that organic foods containing natural salicylates be eliminated from the diets of those individuals with aspirin allergy (in IBID). These nutritonal claims were the foundation of the nutrtional menu demonstrated in The Feingold Cookbook For Hyperactive Children.

(1979).

Initially there was very little skepticism regarding the effectiveness of the KP Diet (IBID). As mentioned previously, Feingold's early reports of the diet's success were claimed to reach as high as 50% of those exposed (IBID). These findings were based on reports of mothers with hyperactive children following the administration of the diet for a number of weeks (IBID). As a means of defending the lack of success for half of the individuals, Feingold suggested a lack of adherence to the diet (IBID). Furthermore, he claimed that additives consumed during pregnancy could also account for the low effectiveness rate (IBID). Thus, Feingold attributed any failure to irreversible damage, sustained in utero when food additives crossed the placental barrier, affecting the growing nervous system of the child (in IBID).

In short, Feingold reported children with learning disabilities and hyperactivity responded well to the elimination of additives (in IBID). Further, he claimed that improvements were made in the areas of muscle coordination, writing, and speech abilities (in IBID). Feingold also reported that the diet was risk-free and should present "no special hardship" to family members (in Burlton-Bennet & Robinson, 1987, p331). Interestingly, this claim led to one of the initial inadequacies found with this treatment. The nutritional value of the diet was found to be nutritionally inferior by Conners, Goyette, Southwick, Lees and Andrulonis to their subject's usual diet (in IBID). Dumbrell, Woodhill, Mackie and Leelarthaepin reported the opposite (in IBID).

Several approaches have been used to evaluate the Feingold diet (Mattes, 1983, p319). Two early studies controlled the entire diet of children, comparing the Feingold diet to a Control diet (IBID). Conners, Goyette, and Southwicke (1976) compared one months trials of the Feingold diet and a control diet in 15 children diagnosed hyperkinetic using DSM-II criteria (IBID). The results of this study showed five children improved at least moderately on the Feingold diet while one improved on the control diet (in IBID). In 1978 and 1980, Harley et al. controlled the entire food intake of families who entered a study comparing the Feingold diet to a control diet (in IBID). In this case, opposite results to the Conners et al. study showed no evidence of an overall diet effect (in IBID).

Over the years, conflicting research on the Feingold Diet has appeared. Mattes, Kavale, Forness and others assessed a number of the reviews which have appeared by The Nutritional Foundation (1980), the American Council on Science and Health (1980) and the National Institutes of Health (1982) (in Rimland, 1983, p331). Mattes, Kavale and Forness found that all of these reviews of research on the Feingold Diet came to essentially the same conclusion: The Feingold diet is of no value, or, at best, of marginal value for a few children, as a means of reducing hyperactivity (in IBID).

In 1983, Dr. Bernard Rimland concluded that assessments such as that done by Mattes, Kavale and Forness were"...of no value..." for a number of reasons (IBID). Rimland first felt that most of the studies were nearly irrelevant in their claims to having tested "the Feingold Diet" (IBID). Rimland supported his statement by questioning how researchers could claim to have tested the over 3,000 additives that Feingold called into question"... by conducting experiments on fewer than 10 dyes..." (IBID). Rimland also called into question "... the almost trivially small doses of colorings (the researchers used in the Mattes et al. review) in trying to provoke hyperactivity in children..." (IBID).

Rimland concluded his list by stating that inadequate attention has been payed to animal and in vitro studies (IBID, p332). The study of Goldenring, Wool, Shaywitz, Batter, Cohen, Young, and Teicher (1980) reported 163% more activity and 128% greater failures in avoidance learning in rat pups given small amounts of food dyes, as compared to controls (in IBID). Similarly, many test-tube studies showed food colorings to damage nerve tissue, such as those by Augustine and Levitan (1980) and Lafferman and Silbergelb (1980) (in IBID, p333). Rimland questioned why humans would consider feeding themselves and their children such "additive-laden foods that emanate from factories" (IBID).

In 1987, Burlton-Bennet & Robinson designed a single subject study to determine the effectiveness of the Feingold K-P diet in the treatment of a 6-year-old hyperkinetic male hypothesized to be diet-responsive (Burlton-Bennet & Robinson, 1987, p331). A secondary aim was to assess the problems involved in implementing it (IBID). During implementation of the diet, scores on Conners Teacher Rating Scale showed that the subject was perceived to be more attentive while he was on the K-P diet (IBID, p333). Conduct problems were also rated as consistently lower (less hyperkinetic) while on the diet (IBID, p334). A negative finding of the diet came in the diet's preparation. The subject's foster mother found the diet too time consuming to take precise measures of many foods (IBID). Consequently the dietician evaluating the diet reported that there were "insufficient" quantities recorded to give an accurate picture of nutrient intake (IBID).

Because of the discrepant findings and continued public interest, an interagency committee at the National Institutes of Health as well as the Federal Drug Administration (FDA) became involved in research on the Feingold hypothesis (Pescara-Kovach & Alexander, 1994, p144). A pilot study conducted by Weiss et al. (1978) found that 22 of 30 subjects ranging in age from 1 to 7 years showed observable improvement on an additive-free diet (in IBID). In a double-blind study, soft drink beverages that contained 35.6 milligrams of artificial colors were administered on 8 randomly determined days in a 77-day period (in IBID, p145). During the final week, all subjects received normal soft drinks to determine if a return to typical baseline behavior occurred (in IBID). Of the 22 subjects, 21 did not show any change in behavior nor were sleep patterns disrupted (in IBID). Thus, the dramatic behavior improvements claimed by Feingold were not found when additives were eliminated (in IBID).

In 1981, in response to all the negativity, Feingold protested,

> I recommended that, in view of the complexity of the problem and the many compounds involved, studies be designed focusing upon the limited list of colors, which lend themselves to better control. This statement is repeatedly distorted by the Nutrition Foundation to imply that I implicate colors as the most important factor. Neither I nor anyone else has the data today to support such a contention (in Rimland, 1983, p331).

However, although Feingold's research demonstrated his concern for the children's well-being, no absolute or concurrent evidence has emerged in favor of the link between food ingested and adverse behavior (Pescara-Kovack & Alexander, 1994, p145).

Despite the frequent failures to corroborate Feingold's original claims, the diet continues to have loyal followers (Reynolds & Mann, 1987, p656). Many parents have supported the formation of a national association and frequently contact food manufacturers to pursuade them to put additive-free food products on the shelves (IBID). Further, the diet offers an alternative to psychotropic medication which may perhaps contribute to it's widespread acceptance (IBID). Despite this, many medical professionals expess concern over a treatment form that is less valid versus the medications. Parents and professionals should approach this diet with all of these issues in mind.

Candida Albicans yeasts

Feingold was by no means the only researcher to address the issue of intake and behavior. This section will look at another treatment which claims to reduce behavior issues through the removal of other elements of the diet. Dr. William G. Crook raised the idea that the brain may be hypersensitive to certain foods and chemicals (Sieben, 1977, p136). The underlying issue questions whether or not adverse or allergic reactions to foods or food allergies could result in brain allergies (Crook, 1980, p53).

According to Dr. William Crook, there are a number of complex causes of behavior and learning problems (Crook & Stevens, 1987, p131). In his book, Solving the Puzzle of Your Hard-To-Raise Child, Dr. Crook and Stevens wrote about the yeast known as Candida Albicans, which live in the interior membranes of every person's body and cause "minor" infections of the mucous membranes of the mouth (thrush), the rectum and the vagina (IBID, p130). In 1979, Dr. Crook recognized the potential connection between yeasts and behavior when he found an article written by C. Orian Truss, M.D. In the late 1950s-early 1960s, Truss initially made his yeast connection between chronically-ill patients suffering with allergies, migraine headaches, depression and other health-related problems (IBID, p131). These patients experienced relief when treatments were administered featuring yeast-free, sugar-free diets, some of whom also received injections of Candida extract (which appeared to neutralize or block Candida-related symptoms) (IBID).

In order to understand yeast as a potential behavior-causing agent, one must first understand the function of yeasts. When a person is healthy and the resistance (immune system) is strong, Candida yeasts cause few problems (IBID, pp131-132). However, when a person receives repeated or prolonged courses of a broad-spectrum antibiotic drug (such as amoxicillin), yeast-related disorders develop (IBID, p132). The antibiotics destroy both "friendly" bacteria as well as the illness-causing bacteria (IBID). When this happens, yeasts flourish and produce a toxin that affects various organs and systems in the body (IBID).

Research studies by a Japanese yeast and mold expert, Kazuo Iwata, M.D., have shown that Candida organisms produce toxins that seem to affect the immune, endocrine and nervous systems (in IBID, pp133-134). In 1967, Iwata and his colleagues successfully isolated a potent, lethal toxin, called Canditoxin from a virulent strand of Candida Albicans (in IBID, p134). In an article published in 1977, Iwata stated;

> Canditoxin produced unique clinical symptoms in mice... Immediately after...intravenous injections (of toxin) the animals exhibited ruffled fur and unsettled behavior. This progressed...to paralysis of the extremities (in IBID).

Still more support for the yeast connection came from others. In 1985, Steven Witkin, Ph.D. of Cornell University Medical College described studies in which he reported defects in cellular immunity associated with Candida Albicans infections (in IBID). John Whittaker, a veterinarian, commented "Candidiasis is probably today's most overlooked disease in swine production....Piglets with Candida-related health problems experience many symptoms, including irritability, skin disorders and respiratory disease of various types...." (in IBID).

Today the yeast connection, as referred to by Dr. Crook is by no means complete. For those who want to rule out yeast as a potential to alter one's behavior, Dr. Crook and Stevens provide a Candida questionaire and diet in the book Solving the Puzzle of Your Hard-To-Raise Child. According to Dr. Crook, "When I see a hyperactive child, or any child with chronic allergic or other health disorders, who has received many courses of broad-spectrum antibacterial drugs, I put the child on an anti-Candida treatment program and note the response" (IBID, p144). Referred to as a "therapeutic trial", the child must avoid foods that encourage the growth of yeasts in the digestive tract, especially sugar and white-flour products (IBID). Raised breads, cheeses, mushrooms, and other foods containing yeasts and molds are also recommended to be avoided (IBID). The list of foods to avoid is large and is one noted in publications printed by Dr. Crook.

Medical complaints associated with the Candida complex include intestinal problems (constipation, diarrhea, flatulence); distended stomach; excessive genital touching in infants and young children; cravings for carbohydrates, fruits and sweets; unpleasant odor of hair and feet, acetone smell from the mouth; skin rashes; fatigue, lethargy, depression, anxiety; insomnia; behavior problems; may act "drunk"; hyperactivity (in Gerlach, 1993, p60). Doctors can recommend a stool analysis that tests for possible yeast overgrowth (IBID). Treatment for the candida overgrowth usually includes prescription of antifungal medications (IBID, p61). In addition certain experimental herbal formulas are showing promising results in the control of yeast overgrowth (IBID). Symptoms have been found to grow worse at the onset of treatment but may gradually improve if candida growth is in fact contributing to a patient's problems (IBID).

Dr. Bernard Rimland of the Autism Research Institute has suggested that perhaps 5-10% of children with autism have medical profiles which may indicate the possibility of yeast overgrowth (IBID, pp60-61). However, many physicians are not accepting of the possible link between candida and behaviors, let alone severe disorders such as autism (IBID). According to Barbara Kahan in her book Healthier Children: Professional Guidance for Parents in the Areas of Nutrition, Environment and Behavior (1990), "We should also keep in mind that it is not necessary to rely solely on doctors...There are other professionals who can give valuable assistance, such as nutrtionists, reflexologists, social workers, psychologists and acupuncturists..." (p59). Kahan's main suggestion to parents and children concerning health-related issues:

> ...is to fully educate themselves in both prevention, nutrition and other areas of health...a doctor...does not wave a magic wand over patients to make them better... In order for any kind of treatment whatsoever to be given to patients, it is absolutely essential that the patient understands what is going on within themselves so that they can contribute to their own health....(IBID, p61).

By no means, according to Dr. Crook has the potential yeast connection been thoroughly researched or discovered (Crook & Stevens, 1987, p135). However, he comments that the available studies like those mentioned earlier in this section do provide clear evidence that yeast can play a part in contributing to health disorders of many types in children and adults (IBID). Just like sugars and fatty and amino acids, Candida Albicans yeasts should be ruled out as potential behavioral distorters (IBID). Dr. Crook's publications also mention a number of other environmental items that he feels may have the potential to interfere with behavior. Dust, chemicals, and other airborne pollutants should also be researched to determine whether they too have the potential to contribute to a child's or adult's overall behavior (IBID).

Facial Screening

During the early 1970s, The Journal of Behavior Therapy And Experimental Psychiatry reported on the results of a mildly aversive stimulus referred to as facial screening. Facial screening involved covering a subject's face for a number of seconds contingent upon the occurrence of a target behavior (Zegiob et al., 1976, p355). The technique involved the use of a terry cloth bib (IBID). The technique was used largely with children and adolescents.

Early reports on the use of facial screening were difficult to come by. In 1974 Spencer and Lutzker attempted to use facial screening to reduce face slapping, a self-injurious behavior in two institutionalized males with Mental Retardation (in IBID). The results were stated with little more information then "...the facial screening procedure effectively suppressed the self-injurious behavior and was successfully applied by teachers in a classroom setting" (in IBID). Although Spencer and Lutzker's results were positive, further testing needed to be done.

In 1975, Jenkins and Becker also attempted to demonstrate the positive effects of facial screening. Their subject was a "hyperactive retarded" child who engaged in "high frequency" out-of-seat behavior (in IBID). Using a 10-second duration, a teacher administered the facial screening procedure during a 1-hour language training session (in IBID). According to the results and the follow-up data taken at 5 months, facial screening produced rapid suppression of the out-of-seat behavior (in IBID).

In 1976, Zegiob, Jenkins, Becker & Bristow attempted to investigate the effectiveness of facial screening on hand clapping behavior (IBID). The subject was a 7-year-old nonverbal boy, previously diagnosed as a schizophrenic (IBID). At the time the study was initiated, the subject repeatedly clapped is hands during a daily language training session (IBID). The subject responded to language stimuli either by clapping or by simply not responding (IBID). Correct responses, when made, were never accompanied by clapping (IBID). The clapping also occurred when the teacher's attention was directed to the other children in the class, interfering with the latter's performance (IBID).

Zegiob et al used a dark, opaque terry cloth bib which was large enough to cover the subject's face (IBID, pp355-356). At the beginning of each session, the bib was placed around the child's neck (IBID, p356). As soon as the subject began clapping the bib was pulled loosely over the face for 10 seconds, and a verbal command, "No, don't clap", was given (IBID). If the child engaged in the clapping behavior while the procedure was in effect, the bib remained over the face until he had stopped clapping for 3 seconds (IBID).

The results of Zegiob et al. indicated that facial screening was highly effective in suppressing the hand clapping behavior (IBID, p357). During baseline, clapping occurred at a mean frequency of 8.17 episodes per session and appropriate verbalizations at a mean rate of 7.5 (IBID). Concern during the initiation of this study would be that the child would associate the facial screening with his appropriate verbalizations or positive reinforcement (IBID, p356). However, Zegiob et al. made it noted that the two behaviors (clapping and responding appropriately to verbal stimuli) never occurred contiguously (IBID). Therefore, there was no possibility for the inadvertent punishment of appropriate verbalizations or the reinforcement of clapping (IBID).

Zegiob et al. noted the facial screening entailed "...little or no risk to the subject" (IBID, p357). The purpose of the bib was simply to cover the subject's face so that the visual field would be screened (IBID). The teachers involved in Zegiob et al.'s study found the screening to be much more preferable to other techniques, such as time-out, because its application involved little time and did not seriously disrupt classroom activities (IBID). Follow-up data further indicated that the suppression produced by the facial screening had been maintained (IBID).

Surprisingly, very little written negative reaction was found to this technique. However, those who advocate to stop the use of aversive procedures would be quick to add this technique to their list. As discussed in a previous chapter, ethics must be considered when choosing a procedure. Facial screening can be viewed as abusive and neglectful by some individuals and not so by others. Unfortunately there have only been a few studies conducted with facial screening. More studies would have to be conducted before it could ever receive greater acceptance or promotion from professionals.

Dolphin therapy

Since the beginning of time, tales of dolphins saving the lives of humans have amazed and inspired us (Livermore, 1991, p45). Ancient stories of stranded sailors befriended by smiling dolphins decorate museum artwork (IBID). Even today reports of ocean rescues by "man's best friend" in the sea still make headlines in newspapers around the globe (IBID). But of all such stoires, old and new, the one now capturing most people's imagination has nothing to do with ocean-dwelling dolphins and raging seas (IBID). Instead, at the heart of this high drama are captive bottlenose dolphins and handicapped people (IBID).

For more than a decade a handful of innovative therapists have been lowering patients into dolphin pools hoping for some degree of improvement in their clients (IBID, pp45-46). Some therapists believe these animals may be able to help them reach and motivate otherwise unresponsive people because dolphins seem to enjoy spontaneous, nonverbal play and have a reputation for being both gentle and attentive (IBID, p46). In fact, after several studies, most of them have come to the conclusion that, at least for autistic, learning disabled, and emotionally damaged children, swimming with dolphins can indeed improve the quality of life (IBID).

In 1978, David Nathanson, then a young psychology professor at Miami's Florida International University first tried dolphin therapy as a hunch (in People Weekly, 1993, p176). He hypothesized that dolphins could have a powerful stimulative effect on retarded children, increasing their attention spans and improving their retention (in Livermore, 1991, p48). According to Nathanson,

> ...there was plenty of research showing the advantages of the buoyancy and soothing effects of hydrotherapy for head and spinal-cord injuries... and there was plenty of research showing that animals can reduce stress. It just seemed that you could combine those elements and have success with handicapped children (in People Weekly, 1993, p176).

So Nathanson began to test his hypothesis with dolphins. His work spanning over a decade confirmed his theory (in IBID).

In 1988 Nathanson struck a deal with the Dolphin Research Center - a respected facility about 100 miles south of Miami, in Grassy Key, Florida - to use its dolphins two days a week (in IBID). Since his starting point, Nathanson has seen more than 300 patients and as of 1993, has a yearlong waiting list (in IBID). Nathanson carries out his work with 13 "finned assistants" (in IBID). His two-week program, which costs $1,920, includes extensive evaluations and eight 20-minute therapy sessions (in IBID).

Occasionally, according to the article about Nathanson in People Weekly, Nathanson achieved dramatic results (in IBID, p175). Nonverbal children return home talking, and children with motor difficulties attain a measure of grace from the fluid swimming sessions in which the children are pulled around the pool by the dolphin's dorsal fin (in IBID). For most patients, though, improvement is subtler - a single word more clearly enunciated, an attenton span stretched by seconds (in IBID, pp175-176). According to Nathanson, "even those modest gains count as victories" (in IBID, p176).

As a result of Nathanson's early interest, as of 1991, some 50 to 100 health-related professionals now encourage patients to seek-out swim-with-dolphins programs (Livermore, 1991, p46). Interested individuals and families are traveling thousands of miles to take the plunge and dolphinariums worldwide have expressed interest in establishing their own therapy centers (IBID). Largo Key, the first island in the chain of islands known as the Florida Keys hosts Dolphins Plus, one of the four marine mammal facilities authorized to let paying customers swim with their dolphins (IBID). It is also one of the three that host the handicapped (IBID).

Autistic children were among the first to participate in swim-with-dolphins-therapy (IBID, p47). In 1978, Betsy Smith, a colleague of Nathanson's and an educational anthropologist and associate professor at Florida International University in Miami set out to investigate whether dolphins could help her penetrate the guarded worlds of the autistic (IBID). According to Smith:

> dolphins communicate with sound and a tremendous variety of body language. When you work with autistic children and adolescents, you need to pick up their subtle body cues to understand what they are doing and thinking. Dolphins are excellent at reading the body language of people (in IBID, pp47-48).

Smith's first project involved a 16-year-old autistic boy, diagnosed as nonverbal (unable to reproduce human sounds) (in IBID, p48). According to Smith," never before had he interacted in a meaningful manner with another human being" (in IBID). However, by the end of a year of interacting with the dolphins, which included 16 encounters, the boy's teacher noted he was happier, easier to work with, and his attention span had increased from a few minutes to half an hour (in IBID). He also stopped biting his fingers and smacking his head, overcame his fear of stairs and elevators, and was able to smile and show affection (in IBID).

Excited by these results, Smith set out to do a more formal study (in IBID). In 1987, after securing funds from the Caribbean Center for Interdisciplinary Research and the South Florida chapter of the Autism Society of America, Smith invited seven severely autistic adolescents to participate (in IBID). Four were allowed to play with the dolphins twice a day for seven days (in IBID). The other three swam without the dolphins for the same amount of time and were considered the control group (in IBID).

The results of Smith's study were very interesting. In her notes she wrote:

> We have noticed strikingly more interaction among the children who play with the dolphins. When the control group comes home...,they are generally exhausted, and we have a lot of trouble getting them involved in activities. When the dolphin contact group comes home, they run up and down the halls or play with puzzles or crafts. They seem to run circles around the control group. One night two of the kids in the dolphin contact group actually had to be separated because they were laughing and playing so much....(in IBID).

Smith remains cautious, even with such promising study results. She does believe, however, that swimming with dolphins affects "needy" people in ways other therapies cannot (in IBID).

Interest in the dolphin issue is not, by any means, limited to the Florida Keys (in IBID, p49). Researchers in France, Greece, Spain and Australia are considering investigating dolphins (in IBID). Across the Atlantic, in Great Britain, veterinarian Horace Dobbs is investigating the effect of swimming with dolphins on clinically depressed people (in IBID). After a chance encounter with a wild dolphin in the late 1970s, he began to wonder if the dolphins could help people suffering from mental distress (in IBID). He decided to take a man who had been seriously depressed for 13 years to the open sea off Pembrokeshire, where a friendly dolphin was known to frequently appear (in IBID). According to Dobbs, "the man said it was more therapeutic than all the antidepressant medication he had taken over a decade" (in IBID).

Public interest has been stirred by other writings dealing with this subject. In 1991, Patricia St. John published a book titled The Secret Language of Dolphins. Interest in this book and her work won her The Delta Kappa Gamma Society International's Educator Award. Initially a dolphin researcher, St. John discovered from her years of work with Atlantic Bottlenose dolphins that she could break through to autistic children. St. John spent years experimenting with the autistic and dolphins by attempting to instruct poolside. Rewards would include much-anticipated swims with dolphins.

St. John had found that the circle that she had created between autistic children, dolphins, and herself had become "a triangle" (St. John, 1991, pp264). "No longer was the equation simply dolphins and autistic individuals" (IBID). According to St. John:

> words aren't necessary to make us understand each other. No matter what our species, we all speak the same secret language...steeped in silence, in voices that tell stories hidden to the ears but not the eyes and our other heightened perceptions, we create subtle bridges of communication through the recognition of our most basic universal forms of ..behavior (IBID, pp267-268).

Like St. John, some of the originators of this therapy have been pleased with the enthusiasm it has generated.

Many sponsors of the therapy fear that if there is a proliferation of swim-with-dolphins programs in the absence of regulation and professional conduct, both vulnerable people and captive dolphins stand the chance of being exploited (Livermore, 1991, p46). In Europe, there is also growing concern for the animals, and this has apparently slowed things down (IBID, p54). As of 1991, this concern has halted expansion plans in the United States (IBID). The difficultly is that the therapeutic swim-with-dolphins programs are hosted by the same facilities that run the profit-making swim-with-dolphins programs for the general public (IBID).

The use of dolphins in these programs has prompted several private groups and government agencies to voice concern over a number of issues. The National Marine Fisheries Service (NMFS), the federal agency that oversees the capture and maintainence of dolphins, has received correspondence from several parties, including Florida's Department of Natural Resources, raising safety issues (IBID). Among their biggest concerns are disease transmission between dolphins and humans, increased stress on the animals, and risk of injury to humans (IBID). Although aggression is not typical of human-dolphin interactions, there are a few documented cases of dolphins injuring humans, sometimes severely, while swimming with them (IBID).

As a result, in November 1989, NMFS announced that the four facilities authorized to use dolphins in swim programs may not have their permits renewed (in IBID). But after several months of consideration, NMFS, in a final environmental impact statement, stated that "no significant new information regarding swim programs' effects on dolphin biology, mortality and disease, or public health and safety was received during the comment period" (in IBID). Therefore, NMFS extended the experimental permits to all four facilities until December 31, 1991 (in IBID). But no additional swim programs, expansions of existing programs, or captures of dolphins from the wild for this purpose would be authorized beyond this period (in IBID).

According to Nathanson, "the integrity of the animal is paramount" (in IBID, p55). The philosophy of a facility like Dolphin Plus is that to force an animal to interact with humans against its will is unthinkable and no amount of educational or therapeutic value would justify treating an animal that way (in IBID). Further, therapists are pushing for unified standards. Toward this end, in June 1990 at the 22nd International Dolphin and Whale Conference held in Nambucca Heads, Australia, Besty Smith and others proposed a code of ethics for those sponsoring swim-with-dolphins programs (in IBID). Smith suggested that all professionals putting clients into the water with dolphins take water safety training, be certified in adaptive aquatics, have some knowledge of dolphin behavior and never force an animal to interact with their clients (in IBID).

According to Livermore, "it is a thorny issue to say the least" (IBID). If the programs prove to be dangerous, stopping them now will prevent unwanted hassles in the future (in IBID). If they are deemed safe and worthwhile, then those with most invested will be empowered to take the next step, which is to expand responsibly (in IBID). No one can predict the outcome. However, one can hope that the answers are sought so as to assist in improving the quality of life of those with certain handicapping conditions.

The 1980s

The decade of the 1980s brought to light a number of new issues for those dealing with the needs of handicapped individuals. Family issues were one of the more important of the issues to be emphasized. As more and more individuals returned to live with their families, community absorption of the handicapped individual had to be considered. Community services and adaptaions were required to help these members to become productive members of their communities.

As the 1980s unfolded, parents realized that they had to take the issue upon themselves to bring their needs to the attention of professionals (Patton, et al., 1990, p430). One way they learned to do this was to increase their political strength (IBID). Parents also had to learn how to begin to sensitize professionals to the difficulties of coping with a family member who was disabled (IBID). Issues of stress within the family unit and single-parent family patterns were a few examples of the ways the traditional nuclear family unit was changing. Family members as a whole had to learn to cope with their feelings about having and raising a developmentally disabled individual as well as to revise their outcome expectations (IBID, p436). For the first time grandparent and sibling needs began to be considered beyond those of the mothers and fathers.

Parents began to sharpen their knowledge of their handicapped child's legal rights to the education process. In order to fight for their children's rights, many parents sought formation with other parents and attempted to create organizations to transmit ideas and information. For example, the rapid growth of the Association of Retarded Citizens (ARC-US) attests to its ability to help meet the needs of those who are mentally retarded and their families (IBID, p458). As of 1980 there were approximately 1900 state and local units, with approximately 1,000,000 members (IBID). According to Roos:

> ...the day of the naive parent struggling impotently to find desperately needed services for his retarded child is now past. Parent organizations in the United States... have matured into strong, sophisticated advocates for the retarded and their families. No longer alone and helpless, parents have demonstrated that they can be valuable assests in behalf of their children...(in IBID, pp458-459).

Even today as the formation of strong parent organizations continues, one issue remains a constant one. Parents continuously turn to researchers and the medical professionals to push for treatments and cures. However, many of the different developmental and learning disabilities remain without cures. Parents continue to try the treatments mentioned in the earlier portions of this paper. However, in some instances they are not a total solution. The following section will look at a few of the more recent treatments to be introduced to the field. Space limitations allowed for review of only a few of the treatments. It should be mentioned that in no way are all those available or currently being made available listed here.

Facilitated Communication

The first recorded large-scale attempt to educate people without speech or language was undertaken by the Abbe L'Epee in eighteenth-century France (Crossley, 1992, p46). The Abbe's success in teaching people who were deaf to read and write through the medium of sign had two important implications: first, deaf people were not, as generally had been thought, intellectually impaired; and secondly, the acquistion of language, and written language in particular could be separated from the acquisition of speech (IBID). It was generally thought that speech was a necessary condition for literacy (IBID). For the first time it had been demonstrated publicly that this was not so (IBID).

The development of literacy skills in the absence of speech is particularly relevant in providing alternative means of expression to people with severe communication impairments (SCI) not caused by deafness (IBID, p47). These individuals often lack the hand skills needed for signing and are unlikely to be part of a signing community (IBID). For most people with SCI, spelling is the most powerful means of replacing their speech (IBID). Because of the common misconception that speech must preceede literacy, many people with SCI have not been given the opportunity to develop or use literacy skills (IBID).

Facilitated communication training (FCT) is a teaching strategy currently used with people with SCI requiring aided communication (IBID). These individuals are generally not yet able to access a communication aid independently but for whom direct access with their hands is a realistic and desirable goal (IBID). Any individual whose speech requires augmentation and whose neuromotor impairments inhibit their use of handwriting or signing and significantly affect their use of communication aids are candidates for FCT (IBID). It offers the most to individuals who are ambulant and who need an easily portable communication system that is accessed manually (IBID, p48).

Although not a treatment, facilitated communication (FC) is a method of providing physical support to an individual, which in turn enables him or her to express ideas via an alphabet board, picture board, typewriter, or computer (Gerlach, 1993, p107). Facilitation helps to isolate the index finger, slows movement down, and offers resistance to reduce perseveration on individual letters (IBID). The immediate aim in FC is to allow aid users to make choices and to communicate while they develop their manual skills (Crossley, 1992, p48). As the aid users' skills and confidence increase, the amount of facilitation is reduced (IBID). The ultimate goal is to be able to access the communication aid independently (IBID).

The strategy of facilitated communication training (FCT) was developed in 1986 at DEAL Communication Center in Australia (Crossley & Remington-Gurney, 1992, p29). It was the first center in Australia devoted solely to the needs of people with SCI not associated with hearing loss (IBID, p30). The center was funded by the Australian federal and state governments (IBID). Its small multidisciplinary team included speech pathologists, occupational and physical therapists, and teachers (IBID). The center operated on a transdisciplinary model, and the programs were developed with the input from the different disciplines (IBID, p32).

Since the implementation of the program at DEAL, attention has been drawn to earlier communication programs also involving facilitation (IBID, p34). In 1977, Oppenheim described the use of facilitation to teach handwriting to children with autism (in IBID). In 1985, Schawlow and Schawlow explained how their autistic son started to use a Canon communicator with facilitation (in IBID). In 1989, Johnson described the use of facilitated communication by young adults with various developmental disabilities in a residential facility in Denmark (in IBID). In each of these programs, all individuals for whom facilitation were used had SCI and had presented with impairments of motor skills that initially prevented them from using handwriting or signing for more than the most basic communication (IBID).

In 1980 Rosemary Crossley, an educator from Australia brought public attention to a form of facilitated communication in her book, Annie's Coming Out (Gerlach, 1993, p108). The story documents the success Crossley had in using FC with a teenager diagnosed with cerebral palsy, who was also considered mentally retarded (in IBID). With the help of Crossley, the young woman eventually went on to study at a university (in IBID). A film, called A Test of Love, was based on their story (in IBID). Crossley expanded her methods to work with children with other developmental disabilities, including autism (in IBID).

Douglas Biklen, professor of special education and rehabilitation at Syracuse University in New York found facilitated communication being used successfully in Australia. He brought FC to the United States in 1989 and helped popularize the technique. He wrote a few articles and books on the subject which helped to generate much interest on the subject (in IBID). According to Biklen, the degree of assistance may range from arm support and the actual shaping of the disabled person's hand, to a mere hand on the shoulder (in Regal et al., 1994, p346). No prior literacy training is considered necessary for the disabled person to benefit from facilitated communication (in IBID). A thorough description of the methodology involved in teaching FC can be found in Biklen's 1990 book Communication Unbound: How Facilitated Communication Is Challenging Traditional Views of Autism and Ability/Disability (in IBID).

Proponents of FC support their claims largely on what Biklen calls qualitative research methods (in IBID). Careful observations are made of individuals in their natural environment with no attempt made to control or manipulate variables (in IBID). Using these methods, Biklen reported that 6 individuals who were working with Crossley and required FC assistance were later found to be communicating independently (in IBID). Biklen also reported that individuals seemed to maintain their unique communicative styles and personalities across different facilitators (in IBID).

However, as of 1992, experimental analyses of FC had been discouraged by its proponents. Fear that the controlled evaluation of this process would violate the bond of trust and acceptance that an FC relationship requires (in IBID). In a review of the experimental research done on FC, Green reported on 14 different studies run in either the United States or Australia (in IBID). The results of all of them maintained or carefully established functioning FC partnerships (in IBID). In none of these research efforts, according to Green, was the presence of reliable and valid facilitated communication confirmed (in IBID).

In 1993, Wheeler, Jacobson, Paglieri, and Schwartz ran a carefully controlled study that involved 12 autistic individuals independently judged to be proficient in FC (they were regularly typing in full sentences) (in IBID). The experimental task required the clients to use FC to describe a picture they were viewing (in IBID, p347). Facilitators were shown either no picture, the same picture, or a different picture from the one being viewed at the time by the client (in IBID). Wheeler et al. reported that none of their subject pairs scored correct responses when the facilitator was shown no picture or a picture different from the one shown to the client (in IBID). Strong evidence for facilitator control was found as a result of subject pairs providing correct responses to pictures shown only to the facilitator (in IBID).

The controversy between those groups that claim that FC has no objective base of empirical support and those that claim to witness it daily grew even more intense with the publication of a 1992 study by Calculator (in IBID). Calculator reported that 3 out of 5 subjects did significantly better on the Peabody Picture Vocabulary Test when asked with FC than when given the test on their own (in IBID). Although the task (identifying pictures) was considerably different from the typical task used in FC studies (spelling or identifying words), Regal et al. commented this study suggested that an experimental base of support for FC might exist (in IBID).

In 1992 Newsweek ran an article entitled "Horror story or big hoax?". The article commented on both sides of the FC debate. The writers claimed some parents and educators believed that assisted typing has allowed autistic patients to communicate for the first time ("Horror story or big hoax?", 1992, p76). Others are increasingly skeptical about whether the thoughts and emotions expressed during a FC session are really those of the patients (IBID). Concern centered around the fact that the expressions might have in fact belonged to the facilitators (in IBID). Proponents of FC often cite examples of individuals giving answers to questions or providing information, which the facilitator could not have known, but which was later verified as correct by parents (Gerlach, 1993, p109). Yet, for proponents of FC, scientific evaluations have so far proven disastrous (IBID). In a report by Gina Green of the New England Center for Autism, 20 out of 21 studies showed no evidence of valid FC (in IBID).

As the storm of controversy swelled, it appeared that both critics and supporters became concerned about the new pattern of sexual abuse being communicated through FC (in "Horror or Big Hoax?", 1992, p76). Families were being traumatized by unsubstantiated allegations, while at the same time educators were wary of the risk of suspected abuse they are legally obligated to report (Gerlach, 1993, p109). Tragically, some of the charges may be valid. The mentally disabled, particularly those who can't speak, are especially vulnerable to such victimization (in "Horror or Big Hoax?", 1992, p76).

As of 1992, nobody has been convicted based on a complaint originating from facilitated communication (in IBID). Only a few of the allegations have proved legitemate enough to press charges (in IBID). However, the unsubstantiated claims have cast a wide net of damage (in IBID). Parents have had children taken away and put in protective custody, faced the scorn of neighbors, borne the expense of hiring lawyers- only to receive belated letters of apology from schools months later (IBID). In addition, teachers and aides have had careers ruined simply by the hint of scandal (IBID).

Although many questions remain unanswered, facilitative communication is changing the way many parents and professionals regard those with autism (Gerlach, 1993, p109). It is claimed that some individuals who were once considered "low-functioning" or "intellectually disabled" are now expressing their cognitive skills (IBID). However, as with all techniques, not every person with autism will benefit from this method (IBID). More scientific analysis needs to be conducted to determine whether FC has the validity proponents claim it has. Until many of these questions are answered, facilitated communication will remain one of the less professionally-accepted techniques.

Water-misting

Self-abusive or self-injurious behaviors, also referred to as SIB, stand out as being especially difficult behaviors to alter (Fehr & Beckwith, 1989, p245). A variety of techniques have been tried to reduce the rate of SIB, as mentioned in previous sections of this paper. A technique known as water-misting was studied in 1980 to determine whether it would be successful in the reduction of self-injurious behaviors by researchers Dorsey, Iwata, Ong, & McSween (IBID). The technique involved the use of a water mist directed toward the face as a punisher when an individual engaged in a specific behavior (IBID).

In 1989, a study was conducted by Fehr & Beckwith in order to assess the effectiveness of this technique as a punisher (IBID). The subject was a 10-year-old legally-blind male, diagnosed with mental retardation. The boy engaged in a head banging behavior. Therapists at the boy's residence had unsuccessfully tried physical restraint with a wrist brace as well as electric shock therapy to reduce the boy's head banging behavior. Both were deemed ineffective by the staff that worked with the boy (IBID, p246).

Fehr & Beckwith chose a treatment plan which consisted of commanding "no, (name)", followed by immediately misting the boy's face with water (IBID). The mist was delivered by means of a 32 oz. plastic household sprayer with a single-depression of the trigger (IBID). The water was room temperature (IBID). This punishment was delivered immediately upon any open or closed hand contact or object contact that the child made with his head or face (IBID). When initially introduced, water misting had little impact on the frequency of head hitting (IBID). In this case, successful reduction of the frequency of the head banging occurred only when a primary reinforcer such as food was introduced along with the water misting (IBID, p247).

Interestingly, after implementation of the procedure, the act of eating appeared to fill the time previously occupied by the head banging (IBID). Fehr & Beckwith found that eating had a reinforcement component that acted to maintain the behavior once the behavior was suppressed (IBID). Other researchers on this subject have suggested that the contingent use of a water mist applied to the face may be an effective punisher for aggressive behavior (in IBID).

Despite the success of punishment reduction with the use of water misting, cautionary notes must be considered (IBID). Fehr & Beckwith warned that the potential exists for development of several noted side effects of using punishment to control behavior (IBID). For example, punishment may induce aggression, it may lead to physical or psychological escape/avoidance, and it may produce "emotional disturbances" (IBID). Punishment should always be considered thoroughly for each individual case before being employed (IBID).

Secondly, Fehr & Beckwith warned that punishment should only be used in the context of the following guidelines:

(1) documentation of the failure of nonadversive procedures to modify target behavior;

(2) informed consent of subject or subject's parents or guardians;

(3) committee approval of the behavior plan;

(4) periodic review of procedures and termination of punisher as soon as possible;

(5) periodic observation of persons who implement the procedure;

(6) documentation of the procedure's effectiveness;

(7) the use of designated (qualified) members of the staff to implement the procedure; and

(8) the positive reinforcement of incompatible behavior whenever possible (IBID).

Recall in the behavior modification chapter that a number of these points were previously mentioned for consideration with other punishers like electric shock therapy, overcorrection and facial screening. All of these guidelines must be practiced, and are often carefully regulated by committees which review procedure implementation.

The choice of techniques to control SIB must be determined by ethical considerations (IBID, p245). Behavioral guidelines approved by the National Association for Retarded Citizens (NARC) suggest using the least restrictive procedures, such as differential reinforcement, extinction, exclusionary time out, response cost, and nonexclusionary time out (IBID). Recall that a number of these were previously mentioned in the behavior modification chapter. However, this suggestion may be difficult to follow in many cases of SIB because of the potential harm that may result from continued bodily harm (IBID).

Many who find opposition with the use of punishers question the ethics of spraying an individual in the face with a liquid. Many schools and therapists must consider this as well as the legal implications of getting involved in the practice of such a nonstandard form of treatment. As previously mentioned, Harris and Ersner-Hershfield have also raised similar concerns about the use of aromatic ammonia, lemon juice, shaving cream, mouthwash, or Tabasco sauce as punishers (1978, p1367). For all of these reasons water-misting remains a controversial, nontraditional form of treatment.

Professionally Accepted Treatments

Through the years, a number of treatments have been proposed to increase student intelligence or to make students "normal". These therapies differ from those previously mentioned because these treatments have been promoted, researched, and professionally accepted from within the field of special education. These therapies target a wide range of functioning and have been demonstrated from various disciplines. Many of these therapies may be familiar to the reader because they are widely practiced in settings such as schools, hospitals, therapy clinics and universities.

Interestingly, a common thread between a number of these therapies is that they force the mentally retarded individual to reach within themselves. A few of the treatments focus on artistic expression. Areas include expression through art, music and dance. Other accepted therapies help the individual to develop hobbies and interests. Social development becomes critical as secondary skills that the therapists can "sneak' into play sessions. By no means will all the supported therapies be reviewed in length due to space restrictions on this section of the paper. Those that are mentioned are done so to provide the reader with references to compare against the nonstandard treatments.

A strong attempt has been made in schools to promote the development of the arts for mentally retarded students. Up until the passage of Public Law 94-142, for the most part, music and visual arts teachers were personally and professionally unprepared for the challenge of integrating the child with special needs into visual arts and music activities (Peterson & Foley, 1994, p15). In 1985, the Young Artist Workshops began exploring new ways to meet the needs of this special population (IBID). Since then the results have been astounding. Technological advances such as computer assistive technology, as well as greater public awareness have created special clinics granting access to visual and performing arts.

Art education has provided a challenge to many students. It forces an individual to use the senses and release their minds into the surreal. Many children and adults with special needs have found a creative outlet through painting, sculpture, computer graphics and other forms of art. A Harlem, N.Y. program such as the Harlem Horizon Art Studio is one such example of a therapeutic painting program for disabled youths. Children at this school have found such success with the program that they have had their paintings professionally exhibited. According to Bill Richards, the school's art director,"art therapy is about creating feel-good sentiments...teaches the students to think like artists...there is a much greater intensity in this art than in the art of healthy children...the children's art is authentic" (IBID, p40).

Music therapy is the use of music in all of its forms to modify nonmusical behavior and to promote mental health, social development and adjustment and motor coordination (in Reynolds & Mann, 1987, p1072). According to Nordoff & Robbins, therapeutically, music has been known to have a significant psychological and physiological effect on handicapped students' personality (in IBID). Music therapy in a variety of applications has been practiced in hospitals, schools, institutions and includes movement to music, playing instruments, presenting musicals, attending concerts, dancing, creating music, singing and listening (IBID).

In special education, music therapy has been used to increase handicapped students' abilities to follow directions and to attend to and respond to logical sequences of movement, voice, and music (in IBID). In 1988, after several years of successful therapy in European countries, Drs. Carol and Clive Robbins established the Nordoff-Robbins Music Therapy Foundation Inc., in New York. The Music Therapy Clinic operates as part of the Music Therapy Program at New York University. At Nordoff-Robbins, clients of all functioning levels are encouraged to create music with the therapists through the use of clinically suitable instruments selected from a wide range of high quality instruments, so as to be expressively rewarding, yet requiring little or no training to play (Nordoff-Robbins, 1995). Says Carol Robbins, "there is so much these children can't do, we see what they can do...we never claim to be miracle workers,...a breakthrough can be as subtle as a smile..." (in Adler, 1991, p26).

Related along the same lines is dance therapy. Dance therapy is a method by which movement is incorporated into a therapeutic or educational program (Reynolds & Mann, 1987, p454). As a therapy approach, dance has been used to enhance traditional methods of medical and verbal group therapies with numerous populations, including the aged, the mentally ill and the mentally retarded (IBID). Dance is especially useful with the retarded because it does not require verbal abilities (IBID).

In July 1993, an article was published in the Times Educational Supplement focusing on the success one teacher had while instructing a group of physically-handicapped children. Enlisting the help of a select group of male prison inmates, excluding sex offenders, the dance teacher attempted to develop the children's movement and imaginative skills (in Cohen, 1993, p21). . According to the teacher, Tricia Lawes, "this work also releases other deep emotions-prisoners' guilt, reflections on their families...which can be worked through..."(in IBID). Parents reported to be so thrilled with the effect the work is having on their children that they take them into the priosons themselves during school holidays to continue the sessions (in IBID). "The men have had to work hard to get even eye contact. But the children's co-ordination and communication have developed so rapidly."(in IBID).

Equine therapy refers to prescribed medical treatment that uses horsemanship to alleviate an extensive array of physical, psychological, cognitive, and social disabilities (in Reynolds & Mann, 1987, pp625-626). Brought to the United States from Europe, it has grown steadily in this country in popularity and credibility since 1970 (IBID). Among the benefits accredited to equine therapy by its proponents, riding skill notwithstanding, are improved physical mobility, stability, muscle tone, coordination, and balance; sensory integration; cognitive training and retraining; academic performance; emotional stability; communication and the ability to relate to others and function within a group (in IBID, p626).

Equine therapy's effectiveness depends on the integration of services provided by a physician who prescribes treatment, a physical therapist who designs the therapeutic regimen, and an instructor who implements the program (in IBID). Several associations have been formed to provide interested persons with additional information, including : The North American Riding for for the Handicapped Association (NARHA) (in IBID). Equine therapy is not recommended for all disabilities, however. Epilepsy characterized by seizures, for example, is considered too risky, as are bone and joint anomalies (in IBID).

Other types of pets have been beneficial to the field of special education. Special education students can better learn the basic needs of animals through active participation in a pet's care in and out of the classroom setting (in IBID, p1186). The students learn to identify the need for food, water, shelter, and love (in IBID). Students learn task and relationship commitment as well as strengthen and develop observation skills through involvement with pets (in IBID). Also, the emotions of love, caring, and affection may be developed or more objectively understood by special education students when pets are used (in IBID).

Pet therapy is gaining popularity and its effects are being reported (Haggard, 1985. p1375). Professionals in the child and youth care field are experiencing the value of using animals as theapeutic aids in treating simple problems like loneliness or more complex disorders such as autism (Mallon, 1992, p53). One of the pet's primary functions in therapy has been to serve as the bridge to decrease the initial shock incidental to encountering a therapist (IBID, p54). By having a dog or cat in a therapy session, a nervous child would approach the situation more relaxed.

Ross et al. (1984) conducted a study at Green Chimneys, a 150-acre farm and residential treatment center for children who were emotionally disturbed and learning disabled (in IBID, p61). This study found that "animals employed in therapeutic and educational intervention have a strong involving influence and can be an agent for the development of rapport and therapeutic change" (in IBID, pp61-62). In the Times

Educational Supplement, a story appeared about a teacher who brought a cockatiel into her classroom comprised of children with speech problems. The children spent 15 minutes a day talking to the cockatiel, Pumpkin, encouraging it to speak. The teacher was convinced that the time one boy with hearing loss spent with Pumpkin was enough to convince her that the boy's speech improvement and expansion of his concentration had to do with the bird (Mourant, 1992, p15).

Another widely promoted therapy is known as recreational therapy. Recreational activities are necessary for the total well-being of any individual (in Reynolds & Mann, 1987, p1323). Most individuals learn how to use recreational activities from a lifetime of experiences. But, as with other skill areas, the handicapped often experience difficulties in using free time appropriately (in IBID). Recreational therapy attempts to eliminate or minimalize an individual's disability (in IBID). It uses recreation to assist the handicapped in changing certain physical, emotional, or social characteristics, as well as being concerned with helping the handicapped particpate in activities with the nonhandicapped as much as possible (in IBID). Therefore, recreational therapy may be recommended to help the handicapped to maintain their physical skills, interact socially, and increase academic progress (in IBID).

Play therapy is a therapeutic technique used with children that emphasizes the medium of play as a substitute for the traditional verbal interchange between therapists and clients (in Reynolds & Mann, 1987, p1216). Caplan and Caplan contend that the voluntary nature of play makes it intrinsically interesting to the child and reduces the occurrence of resistance (in IBID). Inclusive play environments were born out of this.

The idea that handicapped children can interact with nonhandicapped children in a relaxed setting is in the forefront of today's special education headlines (Winter et al., 1994, p28).

Sandplay is one type of therapeutic play tool used by many therapists. It assists therapists in observing children while engaged in prevalent themes in play (Allan & Berry, 1987, p301). One of the benefits toward the end of a play therapy session like sandplay is that a relatively nonsocial child may announce "goodbye", "I'm finished" when leaving (IBID). Often, there is a recognizable point at which the process of play stops and a finished work is evident (IBID).

There are two types of therapies that are available within the schools on a daily basis. Physical therapy involves physical restoration through the use of equipment to massage, regulate exercise to improve coordination and balance, reeducate muscles, restore joint motion, and increase the patient's tolerance for activity (in Reynolds & Mann, 1987, p1200). It is the act of teaching motor strengthening, motor control, balance, and other skills to handicapped persons (in IBID, p1201). The principle behind physical therapy is to promote the use of nonhandicapped functions to the handicapped person (in IBID).

Occupational therapists help the patient to develop skills associated with daily living such as dressing, eating and grooming (in IBID, p1117). The primary concern of occupational therapy is response to activity (in IBID). The occupational therapist's task is to help each individual achieve the fullest potential for a productive, satisfying, and self-sufficient life (in IBID, p1118). In both situations, the therapists work with teachers, classroom aides, families and the client to suggest modifications in the patient's home and work environments (in IBID).

Conclusion

The search for treatments to cure the mentally retarded has been an on-going process. Since the 1950s, mentally retarded individuals have become more visible to the community due to the process of deinstitutionalization. Since that time, parents and family members caring for children with incurable conditions have put an increasing amount of pressure on the medical community to locate cure(s). As of early 1995, the medical community has unsuccessfully met the requests to locate cures for a majority of handicapping conditions. The medical community has also been unwilling to support certain treatments due to their methods and ideologies. This lack of curative information has forced many parents to look beyond the support of the medical community.

Over the years, a number of treatment ideas have been proposed for the mentally retarded community. The focus of many of the treatments has been placed on finding ways to increase intelligence and to make the mentally retarded "normal". The researchers who have developed treatment plans have targeted a number of areas including educational, medical, and dietary. Treatments have been hypothesized and tested, including such innovative ideas as altering dietary options, inflicting pain on an individual for committing certain actions, and considering the senses with regards to materials presentation. However, not one of the previously reviewed treatments has proven to be mental retardation's panacea.

Through the literature, it also appears that many researchers and their supporting organizations are unwilling to promote treatments that claim to have the potential to cure the mentally retarded. One reason may be due to the difficulty surrounding any claim made to" be able to cure". It is almost unconscionable to claim that a cure can be achievable without first locating an actual treatment that works. Many recognize that they themselves would not want to be associated with any potentially false premise that a cure for a condition like mental retardation may be available.

It would appear that others cast this human concern aside and become involved in the search for cures due to economic pressure. As depicted in appendix E, the importance of this thrust towards a cure can be placed at philosophical, political and economic levels (Menolascino, Neman & Stark, 1983, p307). The presumption of losing ones' funding may be enough to force some researchers to throw their arms up in a panic, as if searching for cures is the only noble option to the field (IBID). The cartoon depicts a man denying his organization's involvment with curing, promoting acceptance for, or creating happiness in the lives of the mentally retarded (IBID). However, the prospect of the cartoon man's loss of funding may have been enough reason to "reinvolve" himself in the search for cures.

With regards to the advent of certain treatments, the question of the motives of some researchers plagues many skeptics. It would appear that in some instances the sole purpose of attempting to cure the mentally retarded may include the business aspect as opposed to the humanitarian. In actuality, many organizations confide it may be quite difficult to separate the two. However, the main motive behind achieving cures should underlie the premise that the mentally retarded are more than just individuals with classifications. They are real flesh and blood human beings with family members who deserve the dignity to have their concerns about the statuses of achievable cures addressed.

However, it seems only natural that in order to be able to cure an individual, the cause of their ailment must initially be known. Although this may be the ideal scenario, the causes of many of the classifications are not known. With this in mind, researchers are continuing their research efforts for a cure or a combination of cures. Some are responding with genuine attempts. In other cases it would appear that their attempts are not so humanitarian or ethical.

Ethics is critical to the heart of the treatment dilemma. One would have to question whether the mentally retarded are considered to be human when certain treatments are applied. It seems inconceivable that a therapist would recommend implanting animal cells, providing electrical shocks or spraying the face of their own relations with ammonia, Tabasco or other noxious liquids. A proverbial fine line exists which separates the consideration and recommendation of treatments such as those.

Although these are questions which are monumental to the discussion, they are not ones to be easily resolved. What one person considers heinous, another person finds no fault with. It therefore becomes critical that those individuals who prescribe the treatments consider the humanity for the person who must experience them. When considering the application of any treatment, individual cases must be approached from the point of view that each person falls within varying stages of cognitive mental abilities. Therefore, no one treatment may be the answer.

The growth of national and international support groups has helped to disseminate both supportive and oppositional information about treatments through publications and lectures. Parents, feeling they are left with few other alternatives turn to these publications to review the most current options. Without this ability to network, many parents would feel alone to shoulder the burden of their child's prognosis.

Most of the nonstandard treatments have at one time or another been analyzed within the professional publications. Advocates and opponents have debated their inability to achieve mainstream status for a number of reasons. Cell Therapy was one treatment discredited due to it's lack of verifiable studies. From it's introduction, Cell Therapy did not prove to be a worthy treatment. Both Paul Niehans and Franz Schmid claimed that transplanting cells from animals could replace the "damaged" cells thought to cause mental retardation. Even today, Cell Therapy continues to remain unable to gain credibility from the medical community. It would appear that it would be difficult for any treatment to achieve a high level of credibility when doctors and other members of the American Medical Association will not promote it.

Many skeptics raise their eyebrows when the AMA does not approve of a treatment. This is the case of most of the treatments discussed in this paper, including Vitamin Therapy. The AMA and doctors have published statements finding fault with the theory that increasing vitamin intake will improve the condition of some individuals with autism. Dr. Rimland has acknowledged that this is the case with the vitamin therapy. It would appear that Dr. Rimland does not consider this to be a worthwhile reason to stand in the way of his treatment's mainstream acceptance. However, many people do rely heavily on the medical profession to review and inform them of information concerning their bodies and well-being. This has caused some people to stay clear of Vitamin Therapy.

The level of bodily intrusion and injury comes to light when considering other nonstandard treatments. Here lie clear examples of the differences between nonstandard and accepted treatments. One would find it difficult to find reason to morally question the introduction of the arts, music, or dance to any members of a society. However, the mention of Electric Shock Therapy can promote a debate as highly charged as the one which surrounds the death penalty issue. Opponents find it inconceivable how readily shocks are administered to children and adults, some of whom are incapable of understanding the issue and making their own decisions. Facial screening, water misting and other aversive punishers fall into this same questionable category.

Other treatments such as dolphin therapy, auditory integration, facilitative communication and sensory integration may have potential for success. Success in their instances may be found in an area other than that of curing.individuals. If greater success can be found with future study results, these four treatments may have the ammunition to in some way alter or improve the lives of the mentally retarded. What may also stand in their favors is that these treatments thus far hold only the slightest potential for harming an individual versus those of such treatments as water-misting, and facial screening. However, is in all examples of treatments, more conclusive testing and research needs to be conducted.

Perhaps the time has come to pursue tougher legislation of the issue. It is certain that society will continue to request the search for cures. For obvious reasons these requests will not cease until results are achieved. It would appear that the emergence of Human Rights Committes have been a first step toward providing regulation and accountability for the use of ethically-questionable treatments with the mentally retarded. It would also appear, however that this one governing measure may not be enough. Parents and professionals will continue to pursue treatments and cures in the attempt to improve if not enhance the lives of the mentally retarded. Thus far it appears as though the professionally-accepted treatments are meeting this criterion. Here lies another critical difference between those treatments which are accepted and those which are not. It has yet to be determined whether swimming with a dolphin has the potential to enhance a life. The argument can certainly be made against shocking with currents of electricity, misting a person's face with water or covering a face with a bib.

These are just a few of the considerations parents and professionals need to make when reviewing use of the nonstandard treatments. The intent of this paper was to objectively present a number of these treatments. It was revealed through the literature that up to this point researchers have yet to uncover many dramatic results. This means that a considerable amount of research still needs to be conducted at all levels and with all the nonstandard treatments. Until a greater level of scrutiny is made, no day will come when safe, thoroughly-researched treatments will be achieved. This is a sad commentary to have to make concerning the future outlook for a human life.

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Appendix A

Form E-3 - a diagnostic check list for Behavior-Disturbed children

Reprinted from the Autism Research Institute, 4182 Adams Ave, San Diego, CA

SUPPLEMENT TO DIAGNOSTIC CHECK LIST FOR BEHAVIOR-DISTURBED CHILDREN

(Form E-3: Supplement to Form E-2)

This form is designed to provide detailed information related to severe behavior disorders in children. Your answers and those of other parents will be analyzed by computer to gain a clearer understanding of the various types of disorders and their possible cause and cure.

Name of Child ______________________ Birth-date ______________ ICBR Case No. ________

Parents Name ______________________ Street Address ______________________

City and State ______________________ Zip ______________ Phone: ( ) ______________

PART I. QUESTIONS CONCERNING THE CHILD: The following questions are based on study of hundreds of case histories and medical reports on child illnesses having behavioral consequences. Try to answer each question, even though some may seem strange or irrelevant.

INSTRUCTIONS: A. On the line preceding each question write a 0, 1, 2, 3, or 4 using this code:

0 = Don't Know
1 = Definitely TRUE, or emphatically YES (use sparingly)
Use these answers most { 2 = True, or Yes, or statement does apply
3 = False, or No, or statement does not apply
4 = Definitely FALSE or emphatically NO (use sparingly)

B. If the line following each question does not ask for specific information, please use it to write the age or age range when the answer you gave applied. For example, if your child sometimes bit his fingers between ages 3 and 5 years, you would write 2 (True) and 3-5 on the lines.

Sample question: 2 Did the child bite his fingers? 3-5

If the child still bites his fingers, write 3-now, and if he has always bitten his fingers write 0-5 or always.

C. If you want to add information about a topic, draw a circle around the number of the question and write the information on a separate sheet.

Try to answer all questions but leave blanks if you can't.

1. ___Before birth, baby was very active
2. ___Screamed loudly as baby, for no known reason
3. ___As infant had trouble sucking
4. ___As infant was slow eater
5. ___As infant, couldn't find nipple
6. ___As infant, couldn't hold nipple
7. ___Choked and gagged on milk ____
8. ___Was breast fed (till___months)
9. ___As infant, had unusual sounding cry (screechy?___ monotone?____ other?____)
10. ___Pleasant, easy to care-for as infant
11. ___Born on time? (If not weeks___early;___late)
12. ___Constipation ____
13. ___Started on cow's milk at ___ months
14. ___Started on cereals at ___ months
15. ___Had colic as baby ____
16. ___Unusually fat as baby ____
17. ___Given usual multivitamins for children ____
18. ___Refused weaning to lumpy foods ____
19. ___Refused to chew solid foods ____
20. ___Allergy or intolerance to milk ____
21. ___Allergy or intolerance to wheat ____
22. ___Allergic to ______________ ____
23. ___Asthma ____
24. ___Hay Fever ___
25. ___Eczema
26. ___Diagnosed pyloric stenosis____
27. ___Projectile vomiting ____
28. ___Diagnosed celiac disease or malabsorption ____
29. ___Placed on special diet ____
Describe ______________________
30. ___Frequent diarrhea ____
31. ___Toilet-trained easily ____
32. ___Protruding abdomen ____
33. ___Very bulky stools ____
34. ___Abnormal craving for certain foods ____ (Which ______________________)
35. ___Eats very little ____
36. ___Eats unusually large amounts of food____
37. ___Given fluoride in drinking water, pills, or as tooth coating ____
38. ___Had repeated ear infection(s) ____
39. ___Covers ears at many sounds ____
40. ___Likes machinery that buzzes, hums, or vibrates ____
41. ___Only certain sounds seem painful to him ____
42. ___Likes flickering light (fans, spinning objects, flickering his fingers before his eyes___

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43.____Bothered by light (squints, frowns, covers eyes) ____
44.____Likes head under blanket or bedspread when awake ____
45.____Crossed-eye or other eye problem ____
46.____Stares at sun or light bulbs ____
47.____Places eyes right up to bright light bulb ____
48.____Fails to blink at bright lights ____
49.____Has unusually long eye lashes ____
50.____Skin color (lighter___,darker____)than others in family ____
51.____Eyes changed color (at ____ months) (If eyes changed color after age 6 months or if eyes appear to change color at certain times, mark here ____ and explain on an attached sheet.)
52.____Often has dark circles around eyes ____
53.____Pupils of eyes unusually large ____
54.____Before age 2, arched and bent back when in bright light ____
55.____Before age 2, arched back and bent head back, when held ____
56.____Before age 2, struggled against being held____
57.____Before age 2, stiffened body when held ____
58.____Favorite toy at age 3-5 was hard object (What was toy?____________________)
59.____Can recognize more than one or two pictures of people or objects ____
60.____Points to objects with finger ____
61.____Prefers inanimate (nonliving) things ____
62.____Fails to object when parents leave ____
63.____Uninterested in live pets ____
64.____Avoids people ____
65.____Insists on keeping certain object with him____
66.____Always frightened or very anxious ____
67.____Terrified of some harmless objects ____
68.____Shows abnormal fatigue ____
69.____Lines things up in neat rows ____
70.____Draws very accurate pictures ____ (Draws only certain thing?:____________________)
71.____Is extremely cautious ____
72.____Climbs to high places ____
73.____Lacks awareness of danger ____
74.____Inconsolable crying ____
75.____Notices changes or imperfections and tries to correct them ____
76.____Avoids looking directly at persons face ____
77.____Looks at people out of corner of eye (not directly) ____
78.____Looks at objects out of corner of eye (not directly) ____
79.____Very strong desire to do some things--rejects help ____
71.____Lacks initiative, doesn't do things for self ____
72.____Insists on whatever he wants ____
73.____Generally irritable ____
74.____Has violent rages ____
75.____Tidy (neat, avoids messy things) ____
76.____Very sensitive to pain ____
77.____Spends hours at pointless task (like tearing paper, wriggling string) ____
78.____Has collected a particular thing (toy horses, bits of glass, etc.) ____
79.____Grinds teeth together ____
80.____Often whines ____
81.____Makes strong demands (words or gestures) ____
82.____After delay, repeats phrases he has heard ____
83.____After delay, repeats whole sentences he has heard ____
88.____Repeats questions or brief conversations he has heard, over and over, without variation__
89.____Gets "hooked" or fixated on one topic (like cars, maps, death)____
90.____Laughs for no obvious reason ____
91.____Cries quickly, for minor reasons____
92.____Examines surfaces with fingers ____
93.____Examines things closely by smell or sight___ (Mostly:smell__; sight__)
94.____Holds bizarre pose or posture ____
95.____Aware of self as person ____
96.____Runs away from home or school ____
97.____Behavior better during certain weather ____ (Which? ____________)
98.____Chews or swallows nonfood objects ____ (Any specific?) ____________
99.____Stares at own hands ____
100.____Bites nails ____
101.____Sucks thumb and/or fingers a great deal ____
102.____Bites or chews(not sucks) fingers___
103.____Bites wrist or back of hand ____
104.____Wiggles fingers in front of face___
105.____Wiggles fingers at side of face ___
106.____Is left-handed ____
107.____Holds arms shoulder high, palms facing forward___ (Only when walking?__)
108.____Flaps hands ____
109.____Clings, or craves body contact ____
110.____Dislikes being touched or held ____
111.____Intensely aware of odors___
112.____Enjoys being wrapped snugly in blanket (swaddled) ____
113.____Enjoys being lifted and swung in the air ____
114.____Hates to wear shoes ____
115.____Avoids walking on soles of feet (walks on toes only) ____
116.____Skin has peeled from hands ____
117.____Won't use hands ____
118.____Awakens at night screaming and crying ____
119.____Sleeps days--awake nights ____
120.____Sleeps less than normal ____
121.____Sleeps more than normal ____
122.____Has fainted or shown sudden paleness ____ (Cause if known:____________)
123.____Generally limp, poor muscle tone___
124.____Muscle tone of body usually tense___
125.____Urine has odd odor ____
126.____Perspiration has odd odor ____
127.____Seems not to feel pain ____
128.____Hands and/or feet cold to touch ____
129.____Hands and/or feet red or pink ____
130.____Cheeks, tip of nose and ears pink and/or cold ____
131.____Hands and/or feet swollen or unusually puffy ____
132.____Hands and/or feet very sweaty ____

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133.___Head very hot and sweaty (pillow wet) ___
134.___Unusually fast heart beat ___
135.___Had gamma globulin shot ___
136.___Has had worms ___
137.___Not aware of other peoples feelings ___
138.___Sensitive to other peoples feelings ___
139.___Teases others ___
140.___Sometimes negativistic--does opposite of what you ask ___
141.___Hides skill or knowledge, so you are surprised later on ___
142.___Is curious--gets into things ___
143.___Asks questions--tries to understand ___
144.___Stays where should--does not wander ___
145.___Terrified at unusual happenings ___
146.___Won't attempt what he can't do ___
147.___Has imitated others actions ___
148.___Understands "pretend" playing ___
149.___You can't predict what child will do ___
150.___Child tries to control others ___
151.___Child's behavior is purposeless ___
152.___Learned words like "on," "beside," "under" easily ___
153.___Learned words like "bigger,""heavier," easily ___
154.___Learned words useless to himself ___
155.___Learned certain words, then stopped using them ___
156.___Child is very careful ___
157.___Child has had headaches ___
158.___When injured, bleeding doesn't stop easily___
159.___Behavior changed after head injury ___
160.___Describe any symptoms or medical or physical findings on the child (uric acid or thyroid tests, skin or bone problems, convulsions) large head, blind, 6 fingers, rickets etc.)______________________________

____

161. To your knowledge, has child ever had labortory tests of adrenal function?
1___Yes; 2___No; 3___Don't Know
162. Does child have certain abilities which are clearly better than most adults (Perfect pitch, arithmetic, calendar memory)? Describe______________________________

____

163. How does child react to punishment?
___1. Don't punish child
___2. Tries to hit back (at age ___)
___3. Withdraws or sulks (at age ___)
___4. Cries, but settles down (at age ___)
___5. Cries, bad tantrum (at age ___)
___6. Not affected by punishment (at age ___)
164. Year child was born 19___
165. Years brothers born 19__; 19__; 19__; 19__
166. Years sisters born 19__; 19__; 19__; 19__
167. Years mother had miscarriage or stillbirth 19__; 19__; 19__; 19__; 19__;
168. Was child placed in incubator at birth?
1___Yes, for ___days; 2___No; 3___Don't know
169. Child's birth weight: ________
170. Child's eye color now ________
171. Child's hair color now ________
172. Child's hair texture
1___fine; 2___average; 3___coarse

173. How could you best control child's crying as baby?
___1.Walked him
___2.Rocked him
___3.Let him rock self
___4.Medicine
___5.Pacifier
___6.Quieted self when tired
___7.Didn't cry
___8.Don't Know (or other: ______________)

174. Write a number from 1 to 6 on each line below to describe the child's behavior for each year up to now or to age 10.

1=normal, or pretty normal
2=pretty good
3=a bit above his average
4=pretty bad year
5=very bad year
6=worst year

______ 0-1 yr	______ 1-2 yrs	______ 2-3 yrs	______ 3-4 yrs
______ 4-5 yrs	______ 5-6 yrs	______ 6-7 yrs	______ 7-8 yrs
______ 8-9 yrs	______ 9-10 yrs		

PART II

FAMILY: The following questions concern the child's blood relatives, including parents, sisters and brothers, grandparents, aunts, uncles and first cousins.

Indicate on the line following each condition whether that condition is found in the relatives, on either side of the family: Use this code:

0 Don't know of such cases in family
1 Some trace of condition in family
2 Condition is or was found in child's parents or in sisters or brothers
3 Found in both immediate family and relatives

Condition

1.Arthritis ___
2.Hay fever ___
3.Asthma ___
4.Hives ___
5.Allergy to wheat ___
6.Allergy to milk ___
7.Left handedness ___
8.Diabetes ___
9.Hypoglycemia (low blood sugar) ___
10.Gout or high uric acid level ___
11.Strong moodiness or depression ___
12.Celiac disease ___
13.Sprue ___
14.Malabsorption ___
15.Tendency to be a "loner" ___
16.Identical Twins ___
17.Rocked in crib or head-banged as infants___ (Mostly: rocked__; head-banged__)

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Refers to others in the family, not to child

PART II (Continued)

18."Late talker" (started after 15 months old) ___

19.Other problems (Such as epilepsy, Addisons, Multiple Sclerosis, Muscular dystrophy, hemophelia, pyloric stenosis, migraine, color blind, cancer, Parkinsonism, alcoholism etc ___

Other: ___

Quest. 20 - 34 Are about the mothers pregnancy with this child. Use this Code:
1 = Yes; 2 = No; 3 = Don't Know

20___Get progesterone (anti-miscarriage drug)?
21___Get gamma globulin shot?
22___X-Rayed by Dr. or Dentist?
23___Show spotting (bleeding)? (Which months?___)
24___Drank much coffee?
25___Smoke cigarettes? (No. packs/day ___)
26___Silver tooth filling put in or drilled out?
27___Took vitamins for pregnant women?
28___Had illness or injury? (Describe___
___
29___Took laxatives or other drugs? Describe___
___
30___Gained over 25 pounds? (No. of lbs ___)
31___Birth problems? (Caesarian___: Breech___)
Hard labor___; Long or short labor: ___hrs)

32___Excessive vomiting or nausea?
33___Anesthesia used in birth?
(Type, if known___)
34___Post-partum depression?
35Mother's age when child born ___
36Father's age when child born ___
37Blood type (if known): Mother ___
38Blood type (if known): Father ___
39Blood type (if known): Child ___
40National origin of mother's family:
(Ireland, Germany, Austria, Japan, etc.)
___
41National origin of father's family:
___
42Mother given oxygen during labor? Yes__No__

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Appendix B

Studies of High-Dosage Vitamin B6 and Magnesium in Autistic Children and Adults

Reprinted from Rimland, B. (1988b). Controversies in the treatment of autistic children: Vitamin and drug therapy. Journal of Child Neurology, 3, p68.

TABLE

STUDIES OF HIGH DOSAGE VITAMIN B6 AND MAGNESIUM IN AUTISTIC CHILDREN AND ADULTS

AUTHOR/YEAR	SUBJECT/DOSAGE	DESIGN/OUTCOME
1. Heeley & Roberts 1965	16 autistic children 30 mg B6 one time (one child continued)	Tryptophan load test. 11 of 16 children normalized urine. (Child who continued showed "remarkable" progress.)
2. Bonisch 1968	16 autistic children 100 mg - 600 mg B6 (mostly 300 - 400 mg)	Open trial 12 of 16 improved, 3 spoke for the first time
3. Rimland 1973	190 autistic children 4 megavitamins; 150 mg to 450 mg B6	Computer cluster subgroups. 45% "definite improvement" ($p<.02$)
4. Rimland, Callaway, Dreyfus 1978	16 autistic children 75 mg to 3,000 mg B6 (mostly 300 - 500 mg)	Double-blind placebo crossover. 11 of 15 better on B6 ($p<.05$)
5. Gualtieri et al. 1981	15 autistic children 300 mg to 900 mg B6 plus other vitamins & minerals	Open trial 12 weeks, then no-treatment period. 6 children showed "substantial" improvement. Basal serum prolactin levels (PRL) were lower in responders. ($p<.05$)
6. Ellman 1981	16 autistic adults and adolescents. 1 gram/day B6 500 mg/day magnesium	Double-blind placebo crossover. Four showed global improvement, five showed partial improvement.
7. Barthelemy et al. 1981	52 autistic children 11 normal controls 30 mg/kg/day B6 (up to 1 gram) 10 - 15 mg/kg/day magnesium	Three double-blind crossovers, comparing B6 alone, magnesium alone and B6+ magnesium with placebo. B6 + magnesium was best. Highly significant ($p<.01$-$p<.001$) decreases in autistic behaviors; significant ($p<.02$) decrease in urinary HVA
8. Lelord et al. 1981	Study 1: 44 children with autistic symptoms. Study 2: 21 children selected from above 44. 600 mg - 1,125 mg/day B6 400 mg - 500 mg/day magnesium	Study 1: open trial to identify responders. Study 2: double-blind placebo crossover comparing responders and non-responders. 15 of 44 improved. In 14 of 15, improvement disappeared 3 weeks after cessation of treatment. Double-blind study confirmed behavioral improvement ($p<.01$). HVA levels (N=37) also improved ($p<.01$).
9. Martineau et al. 1982	24 autistic children 30 mg/kg/day B6 15 mg/kg/day magnesium	Compared electrophysiological effects of magnesium given alone or with B6. In conditioning experiment, B6 + magnesium significantly improved brain response latencies and amplitudes ($p<.05$).

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TABLE (continued)

10.	Jonas et al. 1984	8 autistic adults 1 gram/day B6 380 mg/day magnesium	Double-blind crossover. Behavior improved significantly; non-significant improvement in HVA excretion.
11.	Martineau et al. 1985	60 autistic children 30 mg/kg/day B6 (up to 1 gram/day) 10 mg - 15 mg/kg/day magnesium	4 crossed-sequential double-blind trials, comparing B6 alone, magnesium alone, and B6 + magnesium with placebo. B6 + magnesium was best. Significant improvement in behavior, HVA excretion, and evoked potentials.
12.	Martineau et al. 1986	1 4-year-old autistic child 30 mg/kg/day B6 15 mg/kg/day magnesium	Long term (8 mo.) study. Clear improvement in behavior, HVA levels, and evoked potentials over the 8 months; deterioration six weeks after cessation resulted in reinstating B6 + magnesium treatment.
13.	Martineau et al. 1988	11 autistic children 30 mg/kg/day B6 10 mg/kg/day magnesium	Controlled study; eight weeks of treatment followed by no-treatment period. B6 group showed significant behavioral improvement, normalization of evoked potentials, drop in dopamine levels. Behaviors returned to baseline when treatment was discontinued.
14.	Rimland 1988	318 autistic children and adults, B6 and magnesium dosage as decided by parents and physicians	Parents rated treatments as to safety and efficacy. B6/magnesium said "helpful" in 43%, "worsened" in 5% (8.5:1 ratio). Best of 12 drugs in this comparison study achieved only 1.8:1 ratio.
15.	Martineau et al. 1989	6 autistic children given 30 mg/kg B6, 10 mg/kg magnesium 8 weeks. 6 autistic children given 1.5 mg/kg fenfluramine 12 weeks.	Comparisons made in electrophysiological (AER) effects of the two treatments. B6, but not fenfluramine, "resulted in the appearance of a conditioning phenomenon and the demonstration of auditory-visual and auditory-tactile cross-modal associations during treatment."
16.	Rossi et al. 1990 (only abstract is available at this time)	Open trial on 30 autistic patients. Ages and dosages not specified.	40% of patients improved "in the most typical behavioral features of autism." HVA, VMA and 5HIAA levels did not correlate with clinical improvement.

Appendix C

Distribution of "Overall Improvement" ratings in first megavitamin study by Rimland.

Reprinted from Rimland, B. (1987b). The use of megavitamins B6 and magnesium in the treatment of autistic children and adults. In Neurobiological Issues in Autism.

Appendix C

Table 1

Distribution of "Overall Improvement" ratings in first megavitamin study (magnesium not used).

	Score	Description	No. of Cases
Definite	90-99	Maximum improvement in all areas	3
Improvement	80-89	Very good improvement	38
45.0%	70-79	Significant (definite) improvement	45
Some			
Improvement	60-69	Some Improvement	41
21.5%			
Possible			
Improvement	50-59	Possible Improvement	37
19.4%			
No			
Improvement	40-49	No Change	20
10.5%			
Adverse	30-39	Some behavior deterioration	4
Effects	20-29	Much deterioration	2
3.6%	10-19	Great deterioration	1
100.%			191

Appendix D

Super Nu-Thera High Dosage B6/Magnesium Formula

Reprinted from Rimland, B. (1993g). Form letter regarding high dosage vitamin B and magnesium therapy for autism and related disorders. San Diego, CA: Autism Research Institute.

SUPER NU-THERA HIGH DOSAGE B6/MAGNESIUM FORMULA

Super Nu-Thera Caplets (Capsule-shaped tablets):

Six caplets contain 5 grams of powder, including 500mg of B6 plus the other nutrients listed. (Equal to one heaping teaspoon of powder)

Super Nu-Thera Powder:

One heaping teaspoon contains 500 mg of B6 plus the other nutrients listed.

Price Per Jar: (n at
the rate of 500

*Caplets
*Powder:

Above pric for UPS
ground ser ail.

For 2nd da $3.00.

As of August '93 a new, better-flavored powder has been available. Formula is slightly different. Phone for price.

Available from:
Kirkman Sales Co.
P.O. Box 1009
Wilsonville, OR 97070
Phone 1-800-245-8282 or 503-694-1600
fax: 503-694-1603

Above information is for your convenience. We have no financial interest in Super NuThera nor any other product.

SIX (6) CAPLETS CONTAIN:		% USRDA
Vitamin A (Soluble)	5000 IU	100
Vitamin D	200 IU	50
Vitamin C (Ascorbic Acid & Sodium Ascorbate)	500 mg.	833
Vitamin B-1 (Thiamine Nitrate)	15 mg.	1000
Vitamin B-2 (Riboflavin-5' Phosphate Sodium)	15 mg.	882
Vitamin B-6 (Pyridoxine HCL)	500 mg.	25K
Niacinamide	30 mg.	150
Niacin	10 mg.	50
Pantothenic Acid (Calcium Pantothenate)	50 mg.	500
Vitamin B-12 (Cyanocobalamin)	10 mcg.	166
Vitamin E	30 IU	100
Folic Acid	400 mcg.	100
Iron (Fumerate)	10 mg.	55
Biotin (d-Biotin)	50 mcg.	16
Calcium (Calcium Sulfate)	250 mg.	25
Magnesium (Magnesium Oxide)	250 mg.	62
Zinc (Zinc Citrate)	10 mg.	66
PABA (p-Aminobenzoic Acid)	30 mg.	*
Inositol	100 mg.	*
Choline Bitartrate	100 mg.	*
Manganese (Sulfate)	1500 mcg.	*
Copper (Copper Oxide)	500 mcg.	25

Does **not** contain artificial color, preservatives, starch or yeast.

Based on data from both the U.S. and France, the B6 intake which many autistic individuals seem to require is, on average, about 8 mg per pound of body weight. About 1/3 as much magnesium is needed. Some individuals will require less, others require more. In terms of the Super Nu-Thera (SNT) powder and capsules:

WT. IN LBS.	MG. OF: B6	MAGNESIUM	HEAPING TSPS OF SNT POWDER	CAPSULES OF SNT
50	386	125	.8	5
70	540	180	1.1	6-7
90	695	230	1.4	8-9
110	850	300	1.7	10
130	1005	350	2.0	12
150	1160	400	2.3	14
170	1314	450	2.6	16

Please re-read the preceding information before starting.

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Appendix E

"The Search For Cures" cartoon

Reprinted from Menolascino, F. J., Neman, R., & Stark, J. A. (1983). *Curative aspects of mental retardation: Biomedical and behavioral advances.* Baltimore, MD: Paul H. Brookes Publishing.

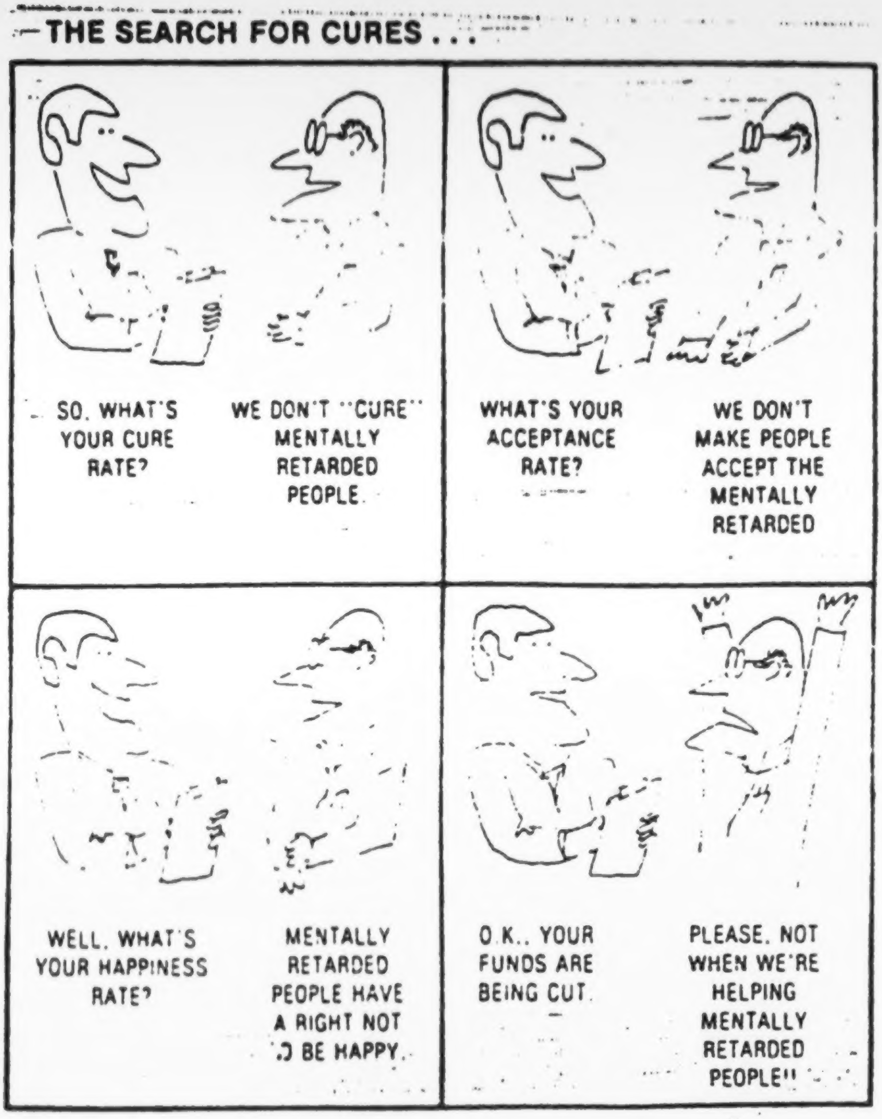
THE SEARCH FOR CURES . . .
SO. WHAT'S YOUR CURE RATE?
WE DON'T "CURE" MENTALLY RETARDED PEOPLE.
WHAT'S YOUR ACCEPTANCE RATE?
WE DON'T MAKE PEOPLE ACCEPT THE MENTALLY RETARDED
WELL. WHAT'S YOUR HAPPINESS RATE?
MENTALLY RETARDED PEOPLE HAVE A RIGHT NOT TO BE HAPPY.
O.K.. YOUR FUNDS ARE BEING CUT.
PLEASE. NOT WHEN WE'RE HELPING MENTALLY RETARDED PEOPLE!!

Figure 2. (Adapted by permission of American Psychological Association, copyright 1981.)

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